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[OFFICIAL NOTICE.]

First Annual Meeting, American Gas Institute.

AMERICAN GAS INSTITUTE,
OFFICE OF THE SECRETARY,
NEW ALBANY, IND., Aug. 27, 1906.

The first annual meeting of the American Gas Institute, composed of the merger of the Ohio, the American and Western Gas Associations, will be held in the Auditorium Hotel, Chicago, Ills., Oct. 17th, 18th and 19th, 1906, and will be called to order by Mr. B. W. Perkins, Altoona, Pa., President of the Ohio Gas Association, who has been selected as presiding officer.

The Auditorium Hotel offers rates to delegates as follows:

Single rooms	$2.00 per day and up.
Two in a room	3.00 per day and up.
Single room with bath	3.50 per day and up.
Double, or two in a room with bath	5.00 per day and up.

Those expecting to attend the Convention are requested to secure rooms in advance of the meeting.

The following Passenger Associations have granted reduced rates on the certificate plan of 1½ fare for the round trip, plus 25 cents for each railroad certificate vised by the representative of the Passenger Associations, who will indorse the certificates: Central Passenger Association, Western Passenger Association, Trunk Line Association, Eastern Canadian Passenger Association, South Western Passenger Association, South Eastern Passenger Association, New England Passenger Association, excepting the Eastern Steamship Company.

These Associations include all the territory of the United States, as far West as Colorado.

Membership blanks have been sent to all of the members of the three above Associations.

It is requested that members avail themselves of the opportunity to become charter members at the very earliest moment, insomuch as 60 days has been decided as the limit for acceptance.

Acknowledgments of the receipts of applications have been mailed to all of those who have forwarded their application to the Acting Secretary. Failure to receive such acknowledgment is indicative that your application for membership has not been received. The Acting Secretary urges upon every person, who wishes to become a charter member, that they lose no time in sending in their application. The qualification for membership is as follows:

From Section 8 of the Constitution.—"Charter members shall be such of the present membership of the American, Ohio or Western Gas Associations as shall be certified by the officers of the same to the Directors of the Institute as qualified respectively for Active, Junior or Associate membership, provided, that to become a charter member it shall be necessary for each person so certified to make application to the Directors of the Institute within a period of 60 days after notice has been sent him of the formation of the Institute."

In the judgment of the joint committee, appointed by the American, Ohio and Western Gas Associations to organize the American Gas Institute, no person delinquent for dues in either of the above Associations shall be eligible for membership in American Gas Institute until such delinquencies are paid.

From Section 5 of Constitution.—"To be eligible to Active Membership, a person must be at least 26 years of age, and be an officer or other employee of a gas company, or a consulting gas engineer, or an employee of a consulting gas engineer. He must be competent to act efficiently as the manager of a department of a gas company's business, and must have his chief interest in the gas business directly connected with the manufacture, sale or utilization of gas, and not the manufacture or sale of apparatus or appliances used by gas companies."

From Section 6 of Constitution.—"To be eligible as a Junior Member, a person must be over 20 years of age and be in the employ of a gas company, or of consulting gas engineer, and must be qualified either by experience or education to hold a responsible position under such employers."

From Section 7 of Constitution.—"To be eligible as an Associate Member, a person must be engaged in a pursuit which constitutes a branch of gas engineering, or to be otherwise qualified to assist in promoting the objects of the Institute."

All charter members are exempt from membership fees. The annual dues, however, are payable in advance as soon as the permanent organization of the Institute is effected.

For those who are not members in good standing, in either the Ohio, American or Western Associations, and who are qualified to become

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members, the following membership fee, including the first year's dues will be charged:

Active membership	$25
Associate membership	25
Junior membership	10

Annual Dues.

Active membership	$10
Associate membership	10
Junior membership	5

A banquet will be provided for the Association members under the usual conditions, which have heretofore prevailed, each member attending paying an amount to be determined upon. The details as yet are not completed.

I would request again upon the members of the Ohio, American and Western Associations, that they attend to the notice received from the undersigned in reference to sending in their application.

The undersigned will be pleased to answer all communications in reference to the meeting, and to send membership applications to any not eligible for charter membership, who may wish to become members of the American Gas Institute.

JAMES W. DUNBAR,
Acting Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

As former editors of the Wrinkle Department of the Western Gas Association and the Ohio Gas Light Association we are requested to collect a budget of wrinkles for presentation at the first meeting of the American Gas Institute, which will be held in Chicago, Ills., October 16th, 17th and 18th, 1906.

Drawings, photographs, sketches and description of any device, formulæ, or methods for accomplishing objects pertaining to the gas business, are respectfully solicited.

Thanking you in advance for contributing promptly. Yours truly,

W. E. STEINWEDELL,
719 Citizens Building,
Cleveland, O.

B. MCADAM,
Milwaukee Gas Light Co.,
Milwaukee, Wis.

[OFFICIAL NOTICE.]

Fourteenth Annual Meeting, Pacific Coast Gas Association.

PROGRAMME.

Officers 1905-06.—John Martin, President; C. O. G. Miller, Vice-President; John A. Britton, Secretary and Treasurer.

Directors.—C. R. Collins, Seattle, Wash.; R. H. Sterling, Watsonville, Cal.; W. F. Boardman, San Francisco, Cal.; Herbert C. Brown, Los Angeles, Cal.

Editors.—Geo. S. Colquhoun, Wrinkles; R. P. Valentine, Experiences; Geo. H. Hollidge, Novelties; Geo. P. Low, Historian.

Librarian.—E. C. Jones.

COMMITTEES.

Committee on Gas Engineers' Degree.—L. P. Lowe, E. C. Jones, John A. Britton.

Committee on Permanent Home.—L. P. Lowe, C. O. G. Miller, Henry C. Keyes.

Advisory Board.—E. C. Jones, C. O. G. Miller, John A. Britton.

Morning Session, 10 A.M. to 12:30 P.M. Afternoon Session, 1:30 P.M. to 5 P.M.

Order of Business, September 18th, 1906 —1. Roll Call. 2. Reading minutes last session. 3. Communications. 4. Report of Secretary and Treasurer. 5. Report of Directors. 6. Report of Special Committees. 7. Report of Library Committee. 8. Balloting on applications for membership. 9. Appointment of Committees. 10. Miscellaneous Business.

After above order of business papers will be read as per list following, but not necessarily in the order in which they are printed.

List of Papers to be Read.

President's Address.

"Should Gas Companies Engage in the Sale of Gas Appliances," W. B. Cline.

"Best Method of Promoting Gas Sales," S. P. Hamilton.

"Experiments with Lampblack in Water Gas Generators," Geo. S. Colquhoun.

"How the San Francisco Gas and Electric Company Supplied 40,000 Consumers After the Fire," E. C. Jones.

"How Electricity was Served to Consumers and Street Car Lines, by the San Francisco Gas and Electric Company After the Fire," L. E. Reynolds.

"Personal Experiences with Municipal Gas Plant," C. E. Moore.

"The Equity of Sliding Scale Gas Rate," F. A. Leach, Jr.

"Experiences with High Pressure Gas Mains," Sherwood Broker.

"Utilization of Gas Engines for Power Purposes," E. C. Lufkin.

"Subject to be Announced," James Goodwin.

"Some Practical Data on High Pressure Gas Compression and Transmission," E. A. Rix.

"The Art of Canvassing," John Clements.

"Novelty," Editor G. H. Hollidge.

"Wrinkle," Editor Geo. S. Colquhoun.

"Experience," Editor R. P. Valentine.

"Historian," Geo. P. Low.

"The Gas Institute," F. H. Shelton.

Upon completion of reading of papers, the following will be the order of business: 1. Report of Committees. 2. Election of Officers. 3. Unfinished Business. 4. New Business.

Wednesday, September 19th, Banquet. Thursday, September 20th, Outing.

JOHN A. BRITTON, Secretary.

BRIEFLY TOLD.

OBITUARY NOTE, MR. CHARLES R. FABEN, JR.—Last week we were obliged to report the sudden death of Mr. Charles R. Faben, Jr., in charge of the lighting division of the properties of the Toledo (O.) Gas, Electric and Heating Company, whose death occurred at his home in Toledo the evening of August 28th. To best illustrate its suddenness we here reproduce this paragraph from a letter written to us by Mr. Fred. R. Persons: "His death was altogether unexpected. The morning of August 28th he was dressed and ready to go to business, when he experienced an acute attack of heart trouble. His physician, who was at once summoned, was with him until noon, at which hour he was comparatively himself. At 6 P.M. the physician found him resting easily, and there was no sign of immediate danger. At 8:45 he was conversing with his daughter. His voice was natural and he appeared perfectly free from pain or trouble. While finishing a sentence, his breathing ceased and life had passed from him as though a light had been put out. Thus he died as he had lived, calmly and peacefully." Deceased, who was born in the old Eleventh Ward of New York city, April 3d, 1854, was the son of an engineer who had served with distinction in the engineering division of the English navy, but who eventually chose the United States as his country. In 1855 his father accepted a responsible position in the engineering department of a large manufacturing concern in New Haven, Conn., and shortly thereafter removed to Hartford, Conn., where he became identified with the Hartford City Gas Light Company. In 1866 he removed with his parents to Toledo, O., at which point he had been appointed Superintendent of works of the Toledo Gas Light and Coke Company. Meanwhile the son had been perfecting himself in a way to fit him for the training of a gas engineer, and he in time took service with his father's Company. In 1876-77 he acted as superintendent of the Marquette (Mich.) Company's works, returning to Toledo in 1877. That year he succeeded his father in the Toledo works, Mr. Faben, Sr., having accepted the position of Engineer at the works of the Milwaukee Gas Light Company. His aptitude and skill as an engineer, together with his ability as a director of men and his tact as a diplomat, caused his eventual promotion to the post of General Manager of the Toledo Company in 1883, and his importance in its affairs caused his retention by the syndicate in whose active service he was when death claimed him. Deceased was prominent in Association work and that his efforts were in that field well appreciated by his fellows, is readily shown in the following brief history of the honors put upon him. He was elected to membership in the Western Gas Association, May, 1885, and he presided at its meeting held in St. Louis, May, 1890. He was really its First Vice-President at the time, but the duties of President devolved upon him through the untimely death of Mr. E. J. King, of Jacksonville, Ills. He became a member of the Ohio Gas Light Association in 1888, and served as its sixth President, directing the proceedings of its meeting held in Zanesville in 1891. His membership in the American Gas Light Association dates from 1885, and at the time of its meeting last year, when the resolution to amalgamate its interests with those of the proposed American Gas Institute was adopted, he was serving it as First Vice-President. His wish and work were always active and patent in advancing the best and broadest interests of the industry in the fields of which he manfully and successfully toiled. He was a vestryman of Trinity Church, Toledo, was a Scottish Rite Mason, and was a promient member of the Toledo Club. In 1879 he was united in marriage to Miss Ida M. Cramer, of Toledo, who survives him, as do a son and daughter. This brief sketch was prepared by one who knew him from boyhood to the end, and it is his privilege to conclude the memoir in the sentence that "Charlie" Faben, as his intimates always addressed him, was in every best sense a man.

[Concluded from page 411.]

FIRST ANNUAL MEETING OF THE NATURAL GAS ASSOCIATION OF AMERICA.

HELD IN THE ASSEMBLY HALL OF THE MIDLAND HOTEL, KANSAS CITY, MO., JUNE 12 AND 13, 1906.

SECOND DAY—AFTERNOON SESSION.

The President—We expected to have a paper from Prof. Haworth, Kansas State Geologist, but for some unexplainable reason he is not here, and Mr. R. Monroe has kindly prepared for us a paper on

THE APPLICATION OF APPLIANCES TO WATER AND STEAM BOILERS.

Mr. Monroe—I may say my paper is more on the line of a little talk on the conditions the gas man will meet with in making installations in hot water boilers and hot air furnaces; and where I refer to the dealer I mean the gas man, or the man making the installation, whether he be the gas man, the plumber, steamfitter, gasfitter, or whoever he may be.

The warm air furnace, cast iron, steam or hot water boiler built for coal or wood, if properly fitted with natural gas burners, gives excellent results. If the heating apparatus is a success with coal, it will be a success with natural gas. If it is economical with coal, it should be the same with gas. If the warm air furnace is put in with a guarantee that it will heat the dwelling house, store or church to a temperature of 70° F. in zero weather, with coal or wood as fuel, then it will do equally as well using natural gas as fuel.

The dealer can learn to install gas burners in any kind of a heating or cooking apparatus in a short time. There is not much mystery about it and nothing difficult. It takes some study and some practice, but the average gasfitter, plumber or steamfitter goes up against more difficult problems every day and surmounts them, and after a time looks back and wonders why he worried when the same thing looks so simple to him now.

We must accept the conditions as they exist, not as we would like to have them, and for that reason the furnace and boiler designed for coal are what we must consider.

The percentage of boilers and furnaces sold in the natural gas territory is so small compared with the coal territory that the manufacturer hesitates to invest capital in special patterns for furnaces or boilers for natural gas. If manufactured gas could be considered for warm air furnaces, hot water or steam boilers as fuel, then the field would be large enough without a doubt.

There are some gas furnaces used in the eastern territory and the results are very satisfactory. They are usually made with thin heating surfaces and, in comparison with cast iron coal furnaces fitted with a gas burner, are more economical. The small furnace, commonly called the hall heater, is becoming more and more a factor as an economical device. There is no limit to the capacity of these heaters, as one or a dozen can be used to heat a building. We have large store buildings, center hall houses and small cottages heated with these small furnaces.

A hall heater that is used without a connection is not recommended. It is strongly advised that the dealers do not use them. A furnace with a flue connection is the only thing to use. Do not let anyone influence you to use heaters or furnaces that are not built on the proper lines. The dealer is morally responsible for the advice and the kind of appliances he gives his customer, and now is the time for the Western dealers to take a stand on this question. Look well to the heating capacity, but see that your customer gets some ventilation and that flue connections are used.

When the dealer is asked to put in a gas burner in a furnace or boiler, he should satisfy himself that there is a good supply of gas and a proper size supply pipe in the building. Gas companies should be consulted on these points in every case. They are out for business and it is bread and butter for them to sell gas, and the dealer should get as close to the gas company as he possibly can. He will invariably get good treatment. It is good business policy for the gas company to encourage the dealer if the dealer shows any inclination to take hold, to do good work, to study conditions, and keep up-to-date.

When the dealer puts in a good installation of burners the gas company secures a good customer, and the result is that there is a good feeling all around. The gas company can refer other customers with confidence to this dealer, knowing that if he gets the work it will be well done and that the customer will be satisfied. The dealer in turn can help the gas company by studying the conditions and using good judgment in fitting up the appliance or device in the way that will give the best results. It does not benefit the gas company much to get a customer started and not be able to keep him on the books.

When the gasfitter starts to put in a burner in a warm air furnace he is confronted with a problem that not only requires some judgment and skill but some patience as well.

The average furnace is not constructed with the idea of providing room for a good size man to work inside the fire pot. The fire door is usually made to fit a coal shovel and under the best conditions it is a hard place to work in. The burner must be made in sections and assembled inside the fire pot and the work must necessarily be done at a disadvantage. Many burners are installed in a slipshod manner on that account and they are condemned because the workman thought he could not do any better under the conditions. Here is where a good mechanic shows his worth.

Care should be used to see that the burner is the proper size for the fire pot. It should be placed in the center.

If the fire pot measures 20 inches, a 17-inch burner is large enough, and it should be an equal distance away from the fire pot all around the circle. The burner should be placed so that it is easy to light and at the same time the fire surface of the fire pot must be considered and utilized to the best advantage. In the average furnace the position of the burner should be from 2 inches to 3 inches below the bottom of the fire door. It is an advantage to admit air around the outside of the burner between the flame and fire pot. The heat from the burner should be directed against the fire surface. Patent fuel should be used when the application of the burner admits it, as it is an advantage when properly placed.

The application in a square fire box as found in the vertical sectional boiler varies some according to the arrangement of the sections. In a boiler where there are openings between the sections the fire surface above the fire box is available and burners can be used that will throw the flame around this surface. The flue space above is ample to carry off the products and there is no danger of smothering. Burners are applied to the water leg on the sides of the fire box and firebrick walls arranged so that the product from the side burners is carried clear of the center burners and the heat deflected against the water leg.

In boilers where the sections are close together and the product must all be carried to the rear in the fire box and then to the front through the flue space and back to the smoke pipe, a different installation should be used. Burners placed on the grate bars covered with patent fuel give good results in this type of boiler. In an installation of this kind burners must be used that have plenty of outlet and the fire box as a rule should be filled with them.

In the ordinary house heating heating boiler the available fire surface for gas burners is nearly altogether confined to the fire box and the flue surface does not amount to much. It is necessary in all cases to burn enough gas to produce the required number of heat units to heat the water hot, or to make steam, or to heat the air, and this cannot be done without burner capacity.

There are some cases where the dealer or gasfitter may put in a fine installation of burners doing the work as well as it can possibly be done and yet when the test is made the results are disappointing. In cases of this kind he must look for the trouble along other lines. To illustrate: A plumber in a gas town in Pennsylvania took a contract to put in gas burners in a steam boiler in a large school building. This plumber had put in a great many burners in furnaces and boilers and was very successful. In this case he took for granted that all he had to do was to put in a good installation and turn on the gas. The burners were installed and the test made in the presence of the school board, but steam could not be raised on the boiler. The gas company was called in and by overhauling the regulator more gas was supplied. The orifices were made larger, more burners put in, in fact everything that could be thought of but with not much better results. The plumber, after going to the limit of his ingenuity, threw up the job, took out the burners and quit, congratulating himself that he was clear of the whole business.

Another party was called in who had quite a reputation for good work, in fact he was looked on as an authority on gas appliances, and the people in the town when the question of gas bills was discussed always consoled themselves with the fact that they used X—s burner and if the gas bill was high there was nothing to be gained by making a complaint as they had the best and there was no use saying anything. This party looked the job over and decided that he was the only one who could help the school board out of their trouble. In fact, he would go further, he would guarantee that gas would not cost them as much

as coal. The school board had been on the lookout for a mark of this kind and did not lose much time in making a contract. As time went on burners were installed in accordance with the ideas gained by long experience and practice, but when the test came the results, and after all that was what the school board were after, were no better, in fact not as good as the first installation. The school board then decided to look for the trouble along other lines and called in a heating engineer. After going thoroughly over the job it was found that the boiler was about 40 per cent. short in capacity and that the janitor could only get up steam by forcing the boiler when using coal in ordinary weather, and that the school had to be dismissed on cold days as steam could not be kept up at all. The flue was found to be small and the draught poor. The evidence plainly indicated a poor heating apparatus and on account of the trouble they had with coal the school board had decided that gas was the only remedy.

This case is cited simply to caution the dealer that he must be on his guard for similar cases and that it is unwise to undertake to do with gas what cannot be done with coal in a boiler or furnace that is designated for coal.

If it was a question of building the boiler or furnace from the foundation up then the burner is not so much of a proposition, but the dealer or gasfitter is called on to do the best he can with a furnace or boiler that is supposed to be of sufficient capacity to heat the building and he takes for granted that the conditions are fairly good.

It is important for the dealer in taking a contract for installing burners to thoroughly investigate the conditions that existed when using coal. To thoroughly clean the boiler and remove all soot and ashes from the sections. This refers to a boiler or furnace that has been in use with coal. There are cases known where burners have been installed in boilers and furnaces without this being done and when the gas was lighted and burned for a time the scale and dirt that were around the sections fell down and choked the burners.

The smoke pipe should be properly cleaned as it is important to have a good draught when burning natural gas. This fact cannot be impressed too strongly on the dealer for the reason that there is more trouble with gas appliances on account of poor draught than any other thing that can be mentioned. A furnace or boiler connected to a poor flue will cause lots of trouble and discomfort in the house. and the dealer or gasfitter should satisfy himself when he has a complaint that the flue to which the appliance is attached is all right. A good draught will overcome a lot of trouble and it is more than half the success of the average gas cooking or heating appliance.

The heating engineer knows that he must put in a certain amount of radiation in a certain sized building, and that he must put in boiler capacity to take care of the radiation if he expects to fulfil his contract and guarantee. The gasfitter takes for granted that this has been done and undertakes to put in burners to supply gas to produce heat to get the results that the heating engineer guaranteed.

If the heating engineer guessed at the amount of radiation and capacity of the boiler and did not take into consideration the kind of building, or the exposure, then the gasfitter has a problem on his hands that he should think over. Poor coal is often an excuse for a failure of a heating job where the coal has nothing to do with it. It was ignorance on the part of the man who designed the job. He was told that there was a flue in the building and that it had an opening in the cellar that could be used to connect the boiler to. He did not examine it or get the size. That there was a flue was sufficient. A case in point is where a heating contractor was asked if it required a good draught for natural gas. His answer was that any old flue would do, so long as it was a flue. So many of these cases have come up in the Eastern field and have all ended in the same way that it will be well for the Western dealer to profit by them.

If you put gas and air into a furnace and can only consume a small part of the volume of the mixture, and the product from the mixture smother the fire if not carried off, you must make ample provision for a good draught.

The gas man meets all kinds and conditions of men and some women. He gets experience with the man who watched the meter for hours and could only raise the temperature of water 10° burning thousands of feet of gas. This is the man who wanted a large mixer put on so that he could burn more air and of course less gas. If he hears a roaring noise in the vicinity of the gas burner he comes to the conclusion that there is a terrible waste, and he wants more dampers put in the smoke pipe at once.

Gas can be wasted just the same as coal can be wasted, and weather strips, storm windows and doors will help a lot to prevent the gas company from becoming too wealthy. The man who, because he gets off with a smaller bill than his neighbor across the street jumps to the conclusion that his gas burner is far superior to his neigh bor's. This does not always follow. The exposure of the house on one side of the street may be so far different from the house on the other side that with any fuel the difference in consumption might vary materially.

It is easy to make the comparison if the facts of the cases are studied. For example: A dwelling house of 12 rooms, 4 on the first and 4 on the second floor occupied, the third floor cut off entirely except what heat would naturally get to the third floor around the door leading to the stairway. This house is warmed with a furnace fitted with a gas burner. The firepot of the furnace is 22 inches, the other fixtures in addition to the furnace are, an instantaneous water heater, a laundry stove, a gas range, two gas logs, three fireplaces. Some gas is used for light but not very much, as electric light is principally used. The temperature in the house during last winter was kept as follows:

Halls and bedrooms 66° to 68° F. Living rooms, 70° F.

This house contains 24,000 cubic feet. Another house containing 40,000 cubic feet has a center hall, 4 rooms on first floor, 4 rooms and 1 bath room and hall on the second floor, 4 rooms and bath room on the third floor, heated with 1,200 square feet hot water radiation with boiler capacity of 1,700 feet; other fixtures are as follows: Instantaneous water heater, laundry stove, gas range, 7 gas grates.

The difference in the consumption of gas in these 2 houses was 25 to 30 per cent. in favor of the larger house. Without stopping to consider the conditions the average gas consumer would say in this case that the difference must be in the gas burners. In these cases the same burners were used exactly. The burner in the warm air furnace being 19 inches in diameter and the one used in the hot water boiler 19 inches in diameter, both the same type of burner. Now why should there be this difference? It might be summed up as follows:

Some difference in favor of the hot water heating apparatus over warm air.

Metallic weather strips and automatic gas regulator with electric thermostatic control.

The hot water heating apparatus was designed as an economical appliance. The house can be heated with the water at a temperature of 160° the coolest winter weather. The radiation is liberal and the boiler capacity ample for the radiation and for the size of the house. If the average householder would watch the temperature and not let the house become overheated, if he will use weather strips and see that there is no extravagant waste of heat he will have much smaller gas bills.

A good gas burner is important and much can be said on this point, but it is not the intention to discuss the merits or demerits of the different burners on the market at this time as it might savor too much of shop at a meeting of this kind. It might be said, however, that good gas burners in all cases have drilled holes and are preferable to cast holes. Burners made of one piece castings without bolts or cement are the best.

After the burner is selected then comes the installation. There is no better way to illustrate the proper setting of a burner than to advise the dealer to strive to get exactly the same results when burning gas as burning coal. In other words, to heat or get the heat units into the surface that heats the air in the warm air furnace or into the water that makes the steam or heats the water in either a steam or hot water boiler.

A manufacturer of high pressure boilers used a number of gas burners of a certain type, in fact that was the only kind he would use as the results were so good. Last winter he installed a 20-horse power upright tubular boiler and fitted it with gas burners. When the test was made he could raise 80 pounds of steam, but could not hold it even with only part of the machinery running. The boiler was supplying the steam for a small engine and live steam for a large kettle in which paste was made.

The gasfitter could not understand what was wrong as he had fitted up a number of boilers to do about the same kind of work and his installation was satisfactory. After trying a number of different things he went to the gas company and told them that he was afraid that the burners would have to be taken out as they could not get satisfactory results. The gas company sent their expert to look the job over and after examining everything very closely found that the service pipe which was an old one was partially filled with scale and rust. The regulator required a little fixing and when the test was made everything worked satisfactorily.

This only goes to show that after the gasfitter makes a good installation and he meets with trouble then he should look for the trouble elsewhere.

Discussion.

Mr. Sears—In regard to one or two points brought out in Mr. Monroe's paper which have not been discussed before, we should remember the inadvisability of using appliances without flue connections. This has been done in the East in a great many cases, and always has been unsatisfactory to both the consumer and the gas company. Some makers put out a stove which they claim requires no flue connection, but in every case combustion takes place, and in that combustion there must be something thrown off which is injurious. Now, in regard to rubber tubing for connecting up stoves, this should be discouraged as much as possible. Of course, it cannot be stopped entirely, but use the best efforts to avoid it. After the tubing has been used for some time, it becomes brittle, and may break by being slightly brushed. A lady in passing may brush against the tubing and break it with her skirt, thus causing a serious accident. These are small points, but they are vital ones, and should be taken into consideration.

Mr. McDowell—In this connection I should like to ask Mr. Monroe what is the cause of the sweating of walls sometimes to the extent of the wall paper dropping entirely? Have you had such experience?

Mr. Monroe—We find that can be accounted for in using ranges with open lid grates, or poor drafts or ventilators. In the summer with the windows open in the kitchen, the range can be used in any way without experiencing any trouble with the sweating of walls, but in the winter with open grates the products come out into the room, and you find you are troubled with moisture. It is simply a question of carrying away the products of combustion in the proper way with a flue connection or by opening the windows. I may say in this connection that in my own house I use the gas range, but never think of using it without a closed lid which is only removed when a vessel is put on the stove directly over the burner.

Mr. Dunkel—I should like to ask Mr. Monroe if that is the only way in which he has experienced that trouble. I have found it with furnaces and heating stoves as well.

Mr. Monroe—It is simply a question of draft. It comes down to that fact that you must connect heating appliances or cooking appliances to a good flue. We have complaint after complaint, and the first thing we say to the man going out to look after them is to look after the flue, and if the draft is good, you will find a tight damper or some condition existing which you can easily find and remedy; and after explaining the trouble to the party so he sees it does not happen again, the difficulty can be entirely remedied. We have complaints of this nature so often that there is no question in my mind but that 75 per cent. of the trouble is on account of the poor draft. Of course, you may have a certain amount of trouble where the combustion is poor, but that shows for itself; it is so plain to be seen that there is no argument about it; but where it is a question of draft, with the uninitiated it is pretty hard to get them to understand that the product must be carried away.

Mr. Barrows—We have had very little difficulty of that kind, possibly on account of the fact that we have closed tops on all the ranges. In the case of the old manufactured gas ranges we hung hoods over them which were so placed that they would gather in nearly all the products of combustion arising from those stoves, which hoods, of course, we connected with flues. Has anyone had any difficulty with the flues themselves sweating?

Mr. Sears—Yes; there has been a great amount of trouble in that respect in the East, and it was thought possibly the extreme cold weather had something to do with it. But that difficulty may be avoided by using soil pipe extending from the furnace to the top of the chimney. Of course, the objection may be raised that this is so expensive; then use galvanized iron spouting; this only lasts a season, however, until it begins to rust out.

Mr. McDowell—This sweating, both on the inside and the outside of the house, is a very serious problem. On the inside it will form a brown discoloration on the wall paper extending down for several feet, and it will trace the line of the chimney on the outside of the house from the cellar clear through. I have seen places where the wall paper has fallen away from the top and side walls. This will occur always on the coldest side of the house, in a room entirely shut off from the rest of the house, and if a lady's dress is hanging in the room it may leave the imprint of the pattern on the wall. This is a very vital question to us.

Mr. Barrows—I should like to ask Mr. Sears what is the cheapest means of using this soil pipe in flues?

Mr. Sears—We generally leave that to a plumber. We recommend the use of this soil pipe, but leave the work to be done by a plumber.

Mr. Welch—The discussion on sweating as the result of the combustion of natural gas is a very important one, and I think it would be well if we could get at the cause of the matter. Of course, we probably know it is the result of the water which is formed from the products of combustion, and I would like to know the amount of water per 1,000 cubic feet of gas; that is, the amount of water formed as a result of combustion.

The President—Is there more water in the combustion of 1,000 cubic feet of natural gas than there is in the combustion of the same number of feet of artificial gas?[1] I think the impression has crept out a little in this talk that the poor combustion causes the moisture, whereas it is the opposite. The more perfect the combustion the more water vapor is given off. If you are taking to your appliance 10 feet of gas an hour and are burning 6 feet, and the rest is going through unburnt, then the relative amount of water vapor that you find in the products of combustion compares with the amount of gas burned—with the amount carried to the burner. It is not the poor combustion stoves which give off the most water vapor; it is the very reverse of that. Now, in regard to flues, we should not use gas stoves without some method for carrying off the products of combustion. You cannot get rid of them unless you do have a flue, otherwise they will come into the room, and the more you burn gas the more you will have.

Mr. McDowell—The impression ought not to prevail that this is a universal difficulty—that the house in which gas is burned is liable to be stripped of its paper; in fact, with well equipped chimneys and good drafts there should be comparatively little difficulty along this line. I know of very few complaints among over 100,000 consumers with whom I am connected.

Mr. Monroe—A very simple way to overcome that is to carry a little higher stack temperature. One blasting furnace concern with which I am familiar used to experience considerable trouble with the moisture forming from the air used in connection with the blasting; they had the greatest difficulty in overcoming that moisture, but they are now freezing the air in order to take out the moisture; and, of course, if we could freeze the air we use in supplying the gas, we would not have much trouble. But, as I say, just run the stack temperature a little higher.

Mr. McClain—In using hot air furnaces sometimes it is pretty difficult, if the flue or chimney is very high, to get the moisture carried out. It tends sometimes to condense before it is carried out, and a good way to remedy this is to take out the brick where the furnace pipe enters the chimney.

Mr. Barrows—Bearing out what Mr. Monroe has said, we have estimated that about 5,000 houses in Kansas City, Kas., are heated entirely with gas, and I do not know of any house, at least I have not heard of any, where they have experienced any serious difficulty with the wall paper dropping off.

The President—In regard to closed tops on gas ranges. Now, why do we want closed tops on the ranges? We do not have them with artificial gas, and there is no more moisture in natural gas, according to the statement, than in artificial gas; so why do we want to charge the consumer $3 to have a closed top put on his range when we get better economy with the open grates?

Mr. Barrows—One way in which we might account for the necessity of a closed top is that natural gas at a lower price than artificial gas is used so much more freely that a greater quantity of the products of combustion is formed, which would go out into the room if not otherwise provided for. If an artificial gas range had been used as freely as the natural gas range, might we not have found the same trouble here? There can be no question but that we do have trouble with the walls sweating with natural gas if the open tops are used and no provision made for proper ventilation.

The President—There is a moisture in the winter caused by the combustion of artificial gas in the kitchen; at our house we have always used a gas range, and in the winter I have noticed, in opening the door quickly, a volume of steam: but as you say, they will use a larger volume of natural gas because it is cheaper. That is true, but the argu-

1. Some days after the meeting in Kansas City, at which this discussion took place, the Secretary of the Association wrote Mr. George S. Barrows, Kansas City, Kas., on this subject, and after investigating it to his own satisfaction, Mr. Barrows replied as follows: Fair average figures showing the number of gallons of water of combustion per 1,000 cubic feet of gas consumed will be, I think, about as follows:

Natural gas	10½ gals. of water per 1,000 cubic feet.
Coal gas	7½ " " " " "
Carburetted water gas	6¾ " " " " "

If, however, we compare the amount of water of combustion, based on the relative heat units, we get the following, assuming natural gas as the standard:

Natural gas	10½ gals. of water per 1,000 cubic feet.
Coal gas when sufficient gas is burned to get the same number of heat units	11½ " " " " "
Carburetted water gas, when sufficient gas is burned to get the same number of heat units	8½ " " " " "

You will, therefore, see that to do the same amount of work there is less moisture in natural gas than there is in coal gas, but more than there is in carburetted water gas.

ment is still there—why do we want a closed top on the natural gas stove? I do not think we do.

Mr. Barnes—I do not wish to be understood as knocking on open top ranges, nor do I wish to go on record as saying anything that can be conveyed into an argument, but the fact remains that there is in the perfect combustion of a 1,000 feet of gas so much vapor; we cannot get away from that fact, it is there; analysis shows it. A certain amount of water is there and has to be carried off one way or the other. Just as Mr. Barrows stated, the reason we do not have any serious trouble with the artificial stove is because the artificial gas is not as universally used as the natural gas. In a great many cases where artificial gas is used, it is the custom to discontinue its use for cooking in the winter just as soon as the effects are noticed; but as has been said, there is no trouble in the summer. In regard to the economy of the open top range as against the closed top, I have found from tests that a closed top is more economical if used in the proper manner. Careful tests have been made on both stoves from making a cup of coffee to preparing a meal for 12 people, and we have found that the higher economy is in the use of the closed top range; but there is no reason why the open top range cannot be used with a little care; and there is no reason why we should insist on consumers changing an open top range for a closed top. Do not make it a point to tell a customer, or intimate to him, that he cannot use a range he may now have. It can be used so close to the economy of the closed top that it does more harm than good to try to induce them to make the change.

The President—I cannot agree with you in regard to the economy. With the heat all around the vessel you will get more economy than where the draft is pulling the heat away. This is a right interesting subject, but I think our conversation here this afternoon would indicate that natural gas is full of moisture, which is not the case. There is not much more moisture in natural gas than in artificial gas; that is what I am combating now.

Mr. Welch—You will admit there is a moisture as a result of the combustion of any gas; and of course in discussing this, we are discussing it among ourselves and are not telling it to our customers; we are going into the fine points, and whether they are a detriment to the consumer or not is another matter. It is important to us to know the underlying reasons of these troubles.

Mr. Sears—I do not want it implied that what I have said will work a detriment to the gas people, but I do think it is right and best, knowing these things have existed, to discus them so that when they do come up, we can remedy them. I think a great deal can be done by selling first-class stoves, and I do not want it implied that what I have said will work a great detriment to us so long as we understand our business and are capable of handling it.

Mr. Whitehead—We are about to lose sight of a little point brought out by Mr. Monroe's paper, and that is ample service; service of ample size; capacity large enough to supply our patrons with gas when they need it in the coldest weather. Has the Association adopted any standard size of service; or what is the smallest size of service it is possible to use in the case of ordinary domestic consumers where there is a range, light and two or three fires?

Mr. Lloyd—We are not running less than 1¼-inch services. We run 1¼-inch where the run is not over 150 feet.

Mr. Dunkel—I will say we run no new service less than 1¼ inch and from that up to 3 or 4 inches as the consumption may require; but I will say in the case of the house I occupy in Lawrence the service is ¾-inch with a 3-inch street main which is very small for the consumption taken off of it, yet last winter I heated this house, which has 9 rooms in it, very successfully all winter. I do not advocate the laying of small services, but if you have the proper appliances installed, satisfactory results can be obtained with small service. This service I speak of is about 75 feet long.

Mr. Mitchell—It is wonderful sometimes how much gas you can get through a small pipe.

Mr. McDowell—That is what the consumer says.

The President—As I have before remarked, we expected a paper from Mr. Haworth on the Technicalities of Natural Gas; and since he is not here, there is no one that can tell us any more about natural gas than Mr. McDowell, from whom we will now hear.

Mr. McDowell—I had no idea of taking Mr. Haworth's place with a talk on the Technicalities of Natural Gas. Two young ladies once touring England were shown through a cemetery, and when the guide pointed out the grave of Cowper and his six wives, one of the young ladies remarked, "My, that is a lot of wives for one man." "Yes," said the sexton, "That were a hobby of his." So this natural gas business is a hobby of mine. When Mr. Mitchell spoke to me about talking to you, I said, "What should I talk about?" A number of years ago I asked that question in a Sunday school class of which I was superintendent, and a little fellow in the audience shouted, "Mister, talk about a minute." So that is what I am going to do, talk about a minute; not on the Technicalities of the Gas Business, but there are a few things I want to say to you. It is now 25 years since I engaged in the natural gas business, laying the first large line, 8-inch, from near Wilcox, Pa., to Bradford, and the following year the line was extended to Olean, N. Y. These cities and Titusville alone were using it for domestic purposes at that time, and in the year 1883 the gas business began in Pittsburgh, Pa. We were pioneers in those days and the gas was used with just any appliance; just stuck a pipe in the stove and let it go; we had no safety devices and this, of course, gave us some trouble with the insurance companies. Wild ideas were entertained on both sides, some saying the supply was inexhaustible, others saying it would last only a short time; and so there was little progress made in the first decade of its history, and investments in the enterprise were looked upon as doubtful. In fact, owing to the manner of handling it, dividends were of the intermittent type. However, in the past years the business has grown to large proportions, until at the close of 1905 it represented an investment of over $175,000,000, the gross earning from which was approximately $50,000,000 in 1905. The investment has more than doubled in the last 6 years, and in 1905 over $20,000,000 was invested in it, while 1906 will show a much larger investment than 1905. Natural gas securities are now in good demand. I have never known a natural gas bond to default in either principal or interest, and, with conservative management dividends are regular. Over 5,000,000 people in the United States are now using natural gas exclusively for fuel and light, and more gas was consumed last year than in any previous year for manufacturing purposes. These facts are the best possible answer to the question, "How long will it last?" And this question will be asked many, many times—"How long will it last?" There is only one instance in which I know of the supply becoming exhausted, and that is in the Indiana fields, and most of us were wise enough to get out of that field at an early date. I hold in my hand the twenty-second annual statement of the Philadelphia Company, dated March 31, 1906. This company supplied natural gas to Pittsburgh, Pa., and vicinity. I notice that it sold an average of approximately 100,000,000 cubic feet per day during the entire year, an increase of 10,000,000 cubic feet per day over the previous year, the gross earnings from which were $4,674,851, and the same story is true of every large company in the East. And let me say to you that the natural gas business is in its infancy at the present time. A man would be looked upon as silly who would say that the oil supply was going to give out, wouldn't he? And the gas supply is several times less likely to give out. Its development in the Middle West has hardly begun. It can only be handled safely with large capital. What has already been done in Kansas and Missouri is the result of years of careful planning and of judicious investment. The selection and development of gas territory warranting the investment of millions of dollars necessary to supply a large city with gas is not a matter of days or months, but of years of painstaking work by skilled men. Even Eastern capitalists cannot buy gas supply as one would buy a house or a farm, and city fathers learn sometimes too late that phantom pipe lines and hot air will not supply consumers on a cold day. Plans are already under way for supplying many large cities between St. Joseph and New Orleans; but as I said, this cannot be done in a day, but we must plan ahead. I want to congratulate you on being engaged in a business that is a blessing to your fellow men; I know of no other one thing that has added more to the sum of human happiness than the use of natural gas for domestic fuel. It is luxury that both rich and poor can enjoy with economy; a perfect fuel carrying itself into the stove of the consumer, requiring only a spark or a flame to ignite it when it approximates to itself sufficient oxygen for perfect combustion. I am pleased to note the great interest taken in the discussion here, and particularly the prevailing sentiment of good service or satisfaction to the consumer. I note that is the tone of the meeting entirely; how can we give the best service to the consumer with the greatest economy? That is the right spirit and should be kept constantly in the foreground. Encourage gas saving appliances; educate the people in its use, particularly its economical use. As you all know, it is a perfect illuminant when properly used; you also know that it is so cheap that it scarcely pays for service, but nothing will do your business more good, as our President has said, than to lose money on your illumination by special care of it. Do not neglect the illuminating end of the business, although there is not a cent in it. Remember your consumer must learn to use natural gas; convince him that if he burns more than necessary, he is wasting money. When bills seem

unreasonably large, even the intelligent consumers will sometimes insist that the gas is diluted with air, and I have known city councils in preparing franchises to struggle over the insertion of a clause to prevent the possibility of such dilution, overlooking the fact that the simple words natual gas are the best possible safeguard against such dilution, even if such a thing was practicable. The great chemist prepared natural gas in nature's laboratory; man has not been able to make even a near approach to a similar product. It is of such a nature that it cannot be mixed with air and conveyed. The difference in the density and gravity alone tends to separation, so that while it may by care be mixed within a few inches of the point of combustiou, so that it will burn well, it cannpt be mixed in a tank or in a pipe line and conveyed any distance without the gas and air being so separated or stratified that its use would be impossible. The talk about pumping air through pipe lines is too absurd to be considered seriously by any intelligent person. The danger incurred by anyone who would undertake it is a sure prevention of its being undertaken. All gas engineers are very careful in case of a break to blow out all the air that may have accumulated in the line by reason of the break before re-connecting the line. I now recall a very serious explosion in a large mill in Pittsburgh, splitting the pipes throughout the mill and for a full square in the street outside by a neglect of this precaution. About 10 to 12 parts of air to one of natural gas thoroughly mixed within a few inches of the combustion point are essential to the use of natural gas; a very little less or a very little more air or an imperfect mixture and the gas will not burn with a steady flame or at all satisfactorily.

Mr. Mitchell—In talking here to-day with my old friend, Mr. Chollar, I told him I knew of nothing in the world that was so fascinating as the natural gas. I said to him, "Mr. Chollar, if I were a capitalist and had money to invest I would certainly put it into a natural gas investment, and I would close off every boiler and every dealer using gas wastefully, and save the supply for the domestic consumer; and I would have an investment that would last me as long as I live and as long as my children live." I believe that if we would supply gas only to the domestic consumer we would have a supply as long as we live and as long as our children live, and I think that is what should be. The natural gas is a blessing to every consumer we have in our city. It gives them money in hand every month, and what is there that you can bring to a city that will benefit the people like that? We have our packing houses and other great commercial enterprises that give hundreds of men employment and bring money into the city, but as a whole the advent of natural gas into the city has proved more of a benefit to the people in general than any one of these enterprises. Natural gas is cheaper than the burning of coal or wood, and the money saved in the use of natural gas may be applied to the purchase of ice or other necessities for comfort, and I would say that the sooner Kansas City is ready to receive the natural gas the better it will be for all her citizens.

Mr. Barrows being asked for remarks upon this subject stated: I do not know that I can add anything upon a subject so well presented by our President.

The President—We were discussing this morning a question box. Now we should have someone to take charge of a question box; someone to make it more than a question box; someone to whom we could write when we desire information regarding a brickyard installation, the installation of a boiler, etc. If we had someone to take charge of that work I think it would be a benefit to us all, and I think Mr. Sears should have that job.

Mr. Springer—I would suggest that we have what might be termed an "Information Bureau," with Mr. Sears, as has been suggested, Chairman of this Bureau, so when we desire information on any subject we can write to him, and he, holding the position he does with the Kansas Natural Gas Company, would know to whom to refer us in the whole circuit for this information. And, therefore, I move that this Information Bureau be established with Mr. Sears as Chairman.

Mr. Barrows—I should like to amend that motion to the effect that Mr. Sears act as a medium, all these communications going to him and the replies coming through him; that is, let us send our questions to him and let him either answer them or get someone else to answer them, sending us the answers without our having to communicate with whoever he may put us in touch. (Motion carried in amended form.)

Mr. Sears—I wish to say that I shall be only too glad to do whatever I can to further the interests of the business we are in.

Election of Officers.

Mr. Welch—I think our officers at present are to be congratulated upon the way in which they handled the affairs of the Association, and I think the business interests of the Association will be furthered by extending their term of office over another year; therefore, I suggest that a motion be made electing the present officers for another year without taking separate votes upon the matter. (Motion carried.)

Some Responses.

Mr. Mitchell—Gentlemen, I thank you for this honor you have conferred upon me, and I promise I will do what I can to further the interests of the Natural Gas Association of America.

Mr. Dunkel—I heartily thank the members of the Association for re-electing me Secretary and Treasurer for another year, and I shall endeavor to give the Association my best attention in every particular.

Routine Matters.

The President brought up the question of reimbursing the Secretary for the time he gives us, as is the custom in other Associations with which he is familiar, and a motion was made that this matter be left in the hands of the Directors for decision.

Next Place of Meeting.

Mr. Springer, Chairman of the Committee appointed to decide on the next meeting place, stated that the Committee had four places in view, but were unable to choose from them, and asked that the Association assist them in making a decision. The places mentioned were Kansas City, St Joseph, Joplin and Pittsburgh. Joplin was decided upon as being the most appropriate one, the meeting to be called the third Tuesday in May, 1907.

Mr. Springer—At Joplin they have a great many large installations and some very interesting mining districts, which Mr. Bullock assures us they will be glad to show the Association in a body if we can arrange to have three days for the next meeting—two days for business and one for a tour through the mining districts.

Mr. Owens—There is no provision made for a meeting between now and the next annual meeting; but it seems to me it would be very profitable to us to have another meeting between now and the annual meeting; it need not be a long session, but I think we can gather a good deal of good from it, and it will keep up the interest.

The President—You are a member of the Board of Directors and we can order a meeting at any time if we deem it wise to do so. It will therefore be understood that we may have another meeting between now and the annual meeting.

Mr. Dunkel said it was his intention to have the proceedings of the previous meetings bound in with the report of the annual meeting, thus having the complete report in one volume.

Mr. Springer—If in order, I should like to say that we are very sorry we did not have the pleasure of listening to a paper by Mr. Haworth, and I would suggest that we make an effort to secure a paper from him and incorporate it in the printed records of the meeting. This should be very valuable to us.

There being no further business before the meeting, a motion was made to adjourn until the third Tuesday in May, 1907.

Officers.

President—K. M. Mitchell, St. Joseph, Mo.
Vice-President.—M. M. Sweetman, Kansas City, Mo.
Secretary-Treasurer.—J. H. Dunkel, Lawrence, Kas.
Board of Directors.—E. S. Springer, Leavenworth, Kas.; W. H. McKenzie, Kansas City, Kas.; H. N. Siegfried, Atchison, Kas.; J. F. Owens, Baldwin, Kas.; K. M. Mitchell, St. Joseph, Mo.

Members.

Atherton, G. R, Joplin, Mo.
Bancroft, P. T., Coffeyville, Kas.
Barnes, G. W., Pittsburgh, Pa.
Bendit, L, Kansas City, Mo.
Brady, M. D., Leavenworth, Kas.
Bullock, C. L., Joplin, Mo.
Barrows, G. S., Kansas City, Mo.
Becker, E. H., Ottawa, Kas.
Brady, J. E., Kansas City, Mo.
Bilimek, H. B., Atchison, Kas.
Cadman, E., Kansas City, Mo.
Connelly, J. S., Carthage, Mo.
Coyle, F. J., Kansas City, Mo.
Dodds, C. J., Lawrence, Kas.
Duncan, A., Parsons, Kas.
Doherty, H. L., Denver, Col.
Dague, A. B. C., Bonner Springs, Kas.
Dunkel, J. H., Lawrence, Kas.
Enright, E. A., St. Joseph, Mo.
Ewing, A. M., Iola, Kas.
Fowks, W., Joplin, Mo.
Frick, K. C., Columbus, O.
Farrington, F. W., Pittsburg, Kas.
Goddard, W. S., Joplin, Mo.
Hammond, W. H., Pittsburgh, Pa.
Henry, W. C., Jr., Cherryvale, Kas.
Holmes, A. G., East Pittsburgh, Pa.
Horton, M. P., Independence, Kas.
Hilt, S. W., Bonner Springs, Kas.
Jones, W. H., Leavenworth, Kas.
Jones, T. C., Delaware, O.
Kidner, R. L., Kansas City, Mo.
Kellum, B. J., Chicago, Ills.
Kerr, J. A., Kansas City, Mo.
Kirkwood, M. F., Decatur, Ills.
Lloyd, T. E. C., Kansas City, Mo.
Mitchell, K. M, St. Joseph, Mo.
Maloney, J. L., Leavenworth, Kas.
McDowell, J. C., Pittsburgh, Pa.
Miller, E. S., Paola, Kas.
McKenzie, W. H., Kansas City, Mo.
Moore, N., Kansas City, Mo.
Moss, C. E., Baldwin, Kas.
McLaughlin, H., Galena, Kas.
Mills, B. E., Atchison, Kas.

Mettler, L. B., Kansas City, Mo.
Mueller, F. B., Decatur, Ills.
Molloy, T. C., Joplin, Mo.
Molloy, D. D., Joplin, Mo.
Munro, R., Pittsburgh, Pa.
Metz, E., Independence, Kas.
Morley, R. C., Chicago, Ills.
Owens, J. F., Baldwin, Kas.
O'Donnell, J. E., Chicago, Ills.
Parker, J. F., Rockford, Ills.
Pattison, C. H., Kansas City, Mo.
Pattison, W. L., Kansas City, Mo.
Riley, J. E., St. Joseph, Mo.
Rose, H. A., Parsons, Kas.
Ranson, J. R., Kansas City, Mo.
Stratton, S. S., Chicago, Ills.
Stuchell, F. L., Independence, Kas.
Steele, F. M., Parsons, Kas.
Snyder, R. M., Kansas City, Mo.
Shreve, J. H., Wichita, Kas.
Sears, C. W., Independence, Kas.
Springer, E. S., Leavenworth, Kas.
Siegfried, H. N., Atchison, Kas.
Sweetman, M. M., Kansas City, Mo.
Walsh, M. W., Wichita, Kas.
Welch, J. S., Philadelphia, Pa.
Williams, B. L., Chicago, Ills.
Welch, W., Independence, Kas.
Wilson, E. D., Webb City, Mo.
Watkins, C. P., Pittsburgh, Pa.
Whitehead, L. K., Shreveport, La.
White, T., Independence, Kas.
Williams, H. O., Joplin, Mo.
Young, J., Joplin, Mo.

State Commissions for Control of Public Service Corporations.

[Prepared by MR. GEORGE MCLEAN, Dubuque, Ia., for the Second Annual Meeting, Iowa Gas Association.]

Gentlemen of the Iowa Gas Association: We are told that the Iowa Municipal League, at its meeting in Des Moines, September 13 and 14, will take the stand that the public service corporations of the State should be placed under the jurisdiction of the State executive council, so far as their taxation is concerned, and that otherwise the city council should retain such control of these corporations as it now possesses. The object of the proposed change, we are informed, is to take these local corporations out of local politics, where they have been a corrupting influence.

The means proposed is not adapted to the end desired. Such public service corporations of this State as may dabble in local politics now will continue the practice if the local authorities retain their present jurisdictiou as to franchises, rates, service, lighting contracts, etc. So the transfer of authority in the matter of their taxation from local to State officers would put them into State politics instead of taking them out of local palitics. And we have no reason to suppose that the public service corporation which is alleged to exercise a sinister influence in local politics would be of service in purifying the politics of the State if given an interest in the personnel of the executive council. On the contrary, if these corporations are as busy in local politics now as certain apostles of reform allege, we should expect to find them under the new order of things trying to control the selection of candidates for members of the executive council and for this purpose using in the caucuses or primaries the local politicians they had already brought to protect their interests in matters remaining under the jurisdiction of the city council.

The republican party of Iowa has just passed through the bitterest anti-convention campaign in its history. According to the victorious faction, the quarrel arose over the efforts of certain railway corporations to control the personnel of the executive council charged with the duty of assessing their property. The claim of the victorious faction is that these corporations dominated the politics of the State for years, chiefly for the purpose of controlling the railway assessments, and that the leader of the railway organization dictated the selection of the republican party's candidates from congressman down to constable. All opposition within the republican party to the successful candidate for its leadership in this State was declared by this candidate himself to be due directly or indirectly to the influence of railway corporations striving to control the politics of the State in their own interest. He declared that the principle for which he stood was the preservation of the State against the domination of its government by these self-seeking corporations. Yet in spite of the hard and bitter struggle his success involved, and notwithstanding the professed desire to purify the politics of the State by ridding it of the corrupt influence of public service corporations, it is now calmly proposed to add the water, lighting, street railway and power companies throughout the State to the list of public service corporations interested in the personnel of the executive council. If a few railway companies could corrupt and control the politics of the State for many years what may we not expect in future of the same railway companies plus all the local public service corporations in the State? If these railway companies desire the restoration of the political power they are alleged to have exercised in Iowa for many years how could they do better than support the proposition to lug the local public service corporations into the fray, and then, having obtained company in their misery, advise their new associates that they must hang together or hang separately? And what would better suit the reform politician relying for his strength on popular jealousy of corporate power than an anti-corporation issue such as could be perpetuated in the politics of the State by the simple process of giving the local public service corporations an interest in the selection of the executive council? That would mean the lugging of these corporations into every gubernatorial campaign. With or without reason it would charged that they were seeking to control the politics of the State in their own interest. The politician in office would say that he wished to stay in, though at a personal sacrifice, to prevent the corrupt public service corporations from throttling representative government, or the politician out of office would say that he wished to get in to redeem the State from the domination of these evil influences in politics. However this war of selfish ambitions among the politicians might result, the constant agitation of the subject of control of these corporations could not fail to have a depressing influence upon their enterprise and progress and consequently a damaging effect upon their usefulness to the communities in which they are situated. The proposition is full of mischief, and, whether it be regarded from the standpoint of the public service corporation or from that of the community or State, nothing but mischief can come out of it.

Apart from the desire to take these local public service corporations out of politics, what is pleaded in support of the proposed innovation? Is there any experimental testimony in its favor? None whatever. Massachusetts for 20 years has had a State Commission for the control of public service corporations. But in the Bay State there is no division of responsibility between State and city in this matter. The State Commission's jurisdiction is practically complete. It has power not only to control the corporation, but also to protect it against hostile local legislation or administration. It controls capitalization, rates, service and competition. The Commission decides whether a franchise shall be granted or renewed and upon what terms.

In Iowa this question is decided by the people themselves at the ballot box in cities under the general incorporation act. Our statute further provides that the city council shall have the right to regulate rates for lighting at any time and that this right may not be abridged by resolution or contract or otherwise. Consequently the people of the community interested may at any time, through their own chosen representatives in the city council, rid themselves of extortion, or what they may consider extortion, in charges for domestic lighting. They have also, through the same body, the power to raise the assessment of any public service corporution which they may believe to be escaping its just share of the burden of taxation.

As for results in the two States, the commission system has given Massachusetts no advantage. Rates are not lower in Massachusetts cites and towns than in Iowa cities and towns of corresponding population. On the contrary, they are considerably higher. A system is judged by its results. If the result of 20 years' supervision by the Commission in Massachusetts had been better rates and service for the consumers, the friends of the Commission would cite the fact as incontestable proof of the desirability of a commission. And the fact that Iowa communities obtain more favorable terms for gas and electric service than Massachusetts communities of corresponding size is evidence that Iowa voters, who now make terms for themselves, have served their own interests better than the Commission has served those of Massachusetts consumers.

The public service corporations of this country, especially the parent companies, have the strongest desire, as they have the greatest interest, in practicing the most complete, significant and intelligible system of accounting; yet, after an experience of 20 years, the Massachusetts Commission has failed to develep any system of accounting which the principal corporations of this character have seen fit to adopt.

The real basis of the demand for the removal of local authority in the matter of taxation of the public service corporations is that this local authority does not enforce their liability to the limit. But does it enforce to the limit the legal liability of capital invested in other manufacturing or mercantile industries no more legitimate or useful to the community? If the failure of the local authorities to enforce the law is the complaint, why not a State commission to control the liquor traffic, which is conducted in some communities of this State in disregard of law? If failure to enforce the law is the offense, why not a State commission to enforce the law relating to assessments against all capital invested in this State instead of that minor proportion invested in public utilities? If the local assessors and boards of review can not be trusted to assess this minor fraction justly and with due regard to the demands of equality can they be trusted to assess the major portion invested in other lines of industry according to the demands of law and justice?

The assessment of railway, telegraph and express companies is necessarily left to the State executive council because their operations extend beyond the boundaries of cities and counties. No such necessity can be pleaded in the case of public utilities located wholly within cities. There is no claim that they are escaping assessment on capital that would be assessed if invested, for example, in the stock of a successful newspaper. There is no claim that the successful newspapers of this State are assessed on the value of their capital stock, or in greater proportion to their market value than the public utilities of the State. A newspaper is not a manufacturing establishment according to the interpreters of the anti-child labor law, and therefore the corporation conducting it is entitled under the laws respecting taxation to no exemption upon its capital stock which may not be claimed by the public service corporation, which, if engaged in the manufacturing of gas or electricity, or the sale of gas or electrical appliances, is in fact both a manufacturing and a mercantile concern.

If the proposition were to treat all capital equally, or hold all capital to its legal liability respecting taxation, whether invested in public utilities, newspapers, factories or merchandise, the public service corporations would be the last to object, since they believe that in the equalization they would fare at least as well as at present. The objection is to singling out a single interest to bear a special burden. This proposition is always made in the name of "equality." But as the argument proceeds it is seen that the demand is not for equality but for inequality and for the denial to public service corporations of the exemptions granted to others, in some cases by authority of law and in others without this authority, but in obedience to custom. This proposed denial is supported on grounds that will not bear examination. It is contended that public utilities are especially profitable and therefore able to bear a special burden of taxation. In the first place, while this may be true of the great cities of the country, where the people have no such referendum and control of franchises and their terms as Iowa has wisely established, and where most of the prejudice against public service corporations finds its source, it is not true of this State, which has but one city of 75,000 population and gives to all its cities the right to control rates at any time. Next, if these corporations are unduly profitable it must be because their charges are excessive. Therefore the government, instead of tolerating the extortion in consideration of taking a share of it in the form of taxes not imposed on capital invested in other forms of manufacturing or mercantile enterprise, should, by exercising its control of rates, abolish the excessive charges and thereby the excessive profit. If the local governments of Iowa are in fact inefficient and corrupt, if home rule of public service corporations is therefore impracticable, if their control can be transferred to the State government without involving them in State politics, if the iridescent purity of our State government is and always will be proof against the evil influence of the public service corporation which is alleged to be the Mephistopheles of municipal government in Iowa, then let us have a State Commission whose control shall not be limited but shall be exclusive and which, instead of perpetuating extortion for the sake of imposing a special burden of taxation upon it, will relieve the consumer of his special burden by abolishing the extortion.

[Prepared for the JOURNAL.]

Plants Run by Gas Engines.

By "ENGINEER."

Fig. 1 shows the plan adopted in one case for the operation of a plant with a gas engine. In my experience I find quite a good proportion of establishments operated by means of modern gas engines; in fact, the practice of installing gas engines of considerable power prevails to a greater extent at the present time than ever before. One reason for this is the fact that the gas engine of to-day is far ahead of its predecessors.

We can all recollect the old days when the gas engines first came into service; then one could find idle engines in any plant. There were cases in which the gas engine gave out in a few weeks, due to the wearing of some essential part, or the slipping of a nut or set-screw, and we often discovered engines which were abandoned and left to rust in the weather, because of actual neglect. All through the farming sections one finds a number of abandoned harvesting machines, usually left to the exposure of the elements. The average farmer does not seem to appreciate the fact that the delicate mechanical motions of the modern harvesting machine do not warrant exposure to wet and the sun; therefore, as soon as he finishes the season's work he allows his excellent piece of machinery to remain exposed until he wants to use it again. Then, finding that the parts bind, due to the rust, he exerts his muscular power to assist the wheels to turn. He employs bars and cranks. The first thing he knows is that something breaks and the fine machine is put out of action. And so it goes with the gas and oil engines occasionally. In former years this problem was a hard one for the makers of gas engines to deal with.

In recent years a more general knowledge of the delicate mechanism of the gas engine assisted to ward off this trouble. I find that instead of permitting the gas engine to be exposed, and instead of letting the parts get dry and rusty, the average user of engines devotes considerable time and care to the preservation of the machinery. The result is that the gas engines of to day may be found in successful operation in almost every plant where used. It used to be the rule to find "dead" gas engines, with the owners waiting for someone to come along who understood the thing, to set the machinery in action once more. It is different now, and such cases are exceptional. Therefore, many of the best manufacturing establishments, of moderate power capacity, are using gas engines to-day instead of other descriptions. As before stated, the plan often used is as exhibited in Fig. 1, which plan shows the position of the engine, on a solid base of masonry or other material, at the lower right hand corner. Near this position the water tank with its proper piping is installed. The other tank is placed just outside the ground, providing that gasoline is used in connection with the gas. In cases in which gases are compressed and stored, the tanks would be at this place, but if common gas is drawn from the pipes direct the tank is

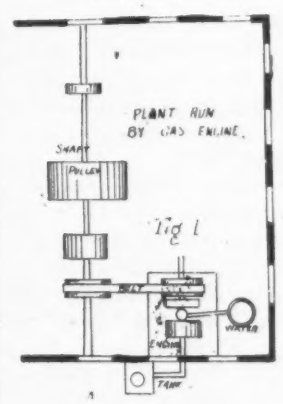


Fig 1

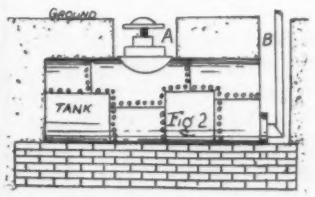


Fig 2

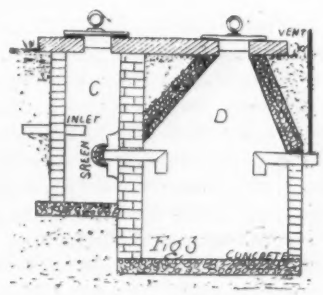


Fig 3

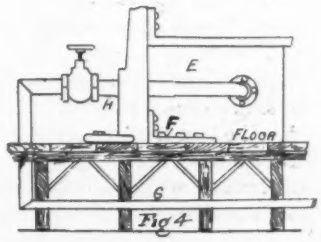


Fig 4

not employed. The adjustment of the main shafting, carrying the pulleys and belts, is as presented along the center of the diagram. The creation of vapors from oils for the purpose of burning a gas, or using a gas for power purposes in connection with the power of the plant, has been introduced in a number of places. One mode of placing the tank underground is shown in Fig. 2. First, an excavation is made in the earth of proper size, and the iron or steel tank is placed in this, with a base of brick or stone as shown. Then the pipe for filling the tank is arranged with the necessary valves as at *A*, and properly covered for protection. The vent is extended down at the line of pipe *B*, where the bottom of the tank is tapped. Another arrangement is shown in the sectional drawing, Fig. 3, in which the plan of the brick-sided and concrete bottom tanks is exhibited. The proper excavation is made in the ground, and the walls are built up with bricks as illustrated. A dividing wall is introduced for the purpose of making a chamber *C*, separated from the vat *D*. There are metal covers for the manholes in each place. The bottom is concrete and the tops are of cast iron with the required openings for the lids. The chamber *C* and the vat *D* are connected with a screened pipe. I find that some gas engines have been put into service in shops and mills regardless of the requirements of a steady condition. In a shop where they were running gas engines I found one of them depended almost entirely upon the piping connections to retain the engine in position. The base of the engine had worked a little out of position. There were marks on the floor to indicate this. The result was that at every turn of the engine the frame vibrated and seemed ready to slip out of place; the engine could not work well under such conditions. Fig. 4 shows one way of securing

the piping in harmony with the engine frame and the flooring. The feet of the frame are properly bored so that bolts can be inserted completely through the casting forming the feet, as at *F*. Then the nuts are put on the ends of the bolts below the floor by going down into the story below. When the nuts are tightened a very permanent job results. The manner of attaching the pipe carrying the gas to the engine is as shown. The pipe follows along the line below, passing through the joists if necessary, or supported on brackets. Then the pipe rises through the floor and takes its proper angle to return to the engine cylinder box, as at *H* and *E*, where the connection with the gas valves is made.

Users of gas engines tell me that many builders make the mistake of shipping engines out to green concerns, where no one knows anything about the setting up and running of such apparatus. The engineer who has operated a steam engine all his life is often adverse to the idea, believing the new fangled thing unworthy, yet he is usually the man first called upon to set up and run the new gas engine. He may try his best, but he cannot grasp the mechanism in a day, with the result that things go against him; the superintendent gets discouraged, and some hard things are said. If, though, someone comes along with the engine and sets it up, illustrating how well it can be operated, the thing appears in another light, and the local engineer can be shown very speedily how to run it. Then all goes well and the gas engine is a success.

[Prepared for the JOURNAL, by Mr. Frederic Egner.]

A New Way of Building Gas Retorts.

The information relating to this new way of building up a horizontal fireclay retort for coal gas works, came to the writer in a small pamphlet, not published in this country previously, and believing the subject might be of interest to your readers, it is herewith submitted. The invention, for such it is, was patented in Germany by Mr. Th. Jerratsch, Gas Inspector with Mr. G. Lindemann & Company, at Schwerin, Germany, and, according to Mr. Jerratsch's statement, it has been in successful operation for nearly 1 year. The system was also the subject of several fine testimonials from professional men who have seen the new retorts in use at the gas works. The old-style retorts, now used for many years, are generally formed in one piece, the "head" or mouthpiece of which is firmly held in place by the masonry of the front wall of the bench. This description of retorts holds good for nearly all works, excepting such as use "throughs" or else inclines.

The arrangement allows for neither expansion nor contraction in the retorts, the consequence of which is, as Mr. Jerratsch points out, that during the first heating up of a bench—either a new one or those fired up after having been "let down"—as soon as the retorts begin to show color, innumerable small cracks make their appearance. Then, when the heat is pushed to the working stage, after the lids have been closed, some of these cracks are enlarged by reason of the unequal expansion and weight of the attached mouthpieces and standpipes. At that stage of the heating up, the front wall is usually forced outward slightly, carrying the mouthpieces of the retorts with them, causing cracks which are only with difficulty kept tight, since they reappear with every scurfing of the retort, as every practical retort house man knows. The result is that as a rule the gas from the first, and often a number of following charges placed into newly fired retorts, is lost entirely, besides the loss of time, skill and material required to make good patches for cracks almost impossible to stop, excepting by the gradually growing skin of graphite or retort carbon; a pretty costly proceeding.

Mr. Jerratsch overcomes this condition in the following manner: He makes his retorts in three pieces, viz., an independent mouthpiece, seat or bottom of the retort, and the body or retort shaft itself, as can be seen by referring to Figs. 1, 2 and 3. Fig. 1 shows a single retort. It

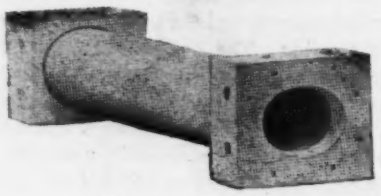


Fig. 1.

will be seen that the outside shape of the mouthpiece and "seat" or

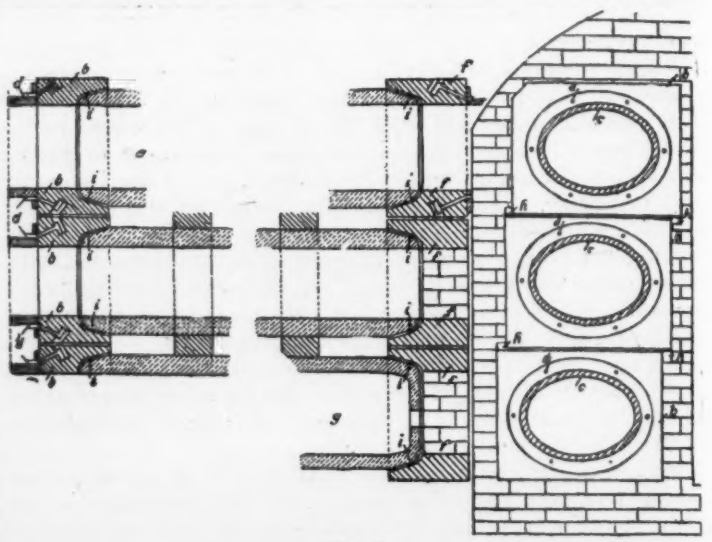


Fig. 2.

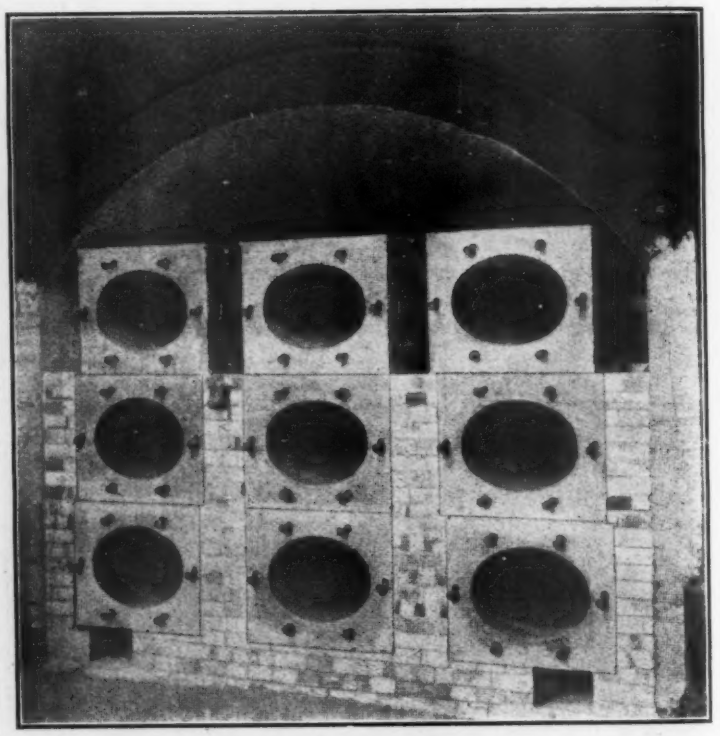


Fig. 3.

bottom of the retort is moulded in a rectangular form, making it easy to place in the surrounding wall saving quite a little time in closing up the front of a new bench, as those familiar with the operation can see at a glance. These rectangular end piece of the retort are upon the inside made with an enlarged hollow space corresponding to the bell or hub end of an ordinary gas main, into which the ends of the body of the retort are pushed, similarly as the spigot end of a gas main is pushed into the hub end of the one next adjoining it. This can be seen in Fig. 2, where *A* represents the front, and *B* the back end of such retorts. But that is not all. The long, taper ends of the retort shaft are made with a shallow recess in them (*i*, *i*, etc., Fig. 4), extending all around that portion of said end, and into this recess is laid a piece of asbestos rope, which, when the three pieces of the retort are pushed together, forms a soft, pliable and reasonably tight joint, which, before charging the first time, is fortified by filling in with fine clay, allowing for expansion in a vertical or horizontal direction. Mr. Jerratsch says that by building the retorts in the manner described, he found no cracks whatever in the retorts after the first heating, and that the very first charge placed into same produced and yielded the full amount of gas from the charge. Those of the readers of the JOURNAL who are familiar with the first heating and charging of fireclay gas retorts will probably feel somewhat doubtful of the entire correctness of such a statement; but if there were no cracks whatever the thing will not appear so very incredible after all. Mr. Jerratsch states further that, after 9 months of constant and hard use of his retorts, during which time these had, of course, to be scurfed a number of times, but a few, and these almost

imperceptible, cracks were to be seen in any one of the retorts set in the manner described.

Small works, many of which (very unwisely) operate without an exhauster, and where the pressure inside of the retort is often equal to the full holder pressure, even the smallest cracks will allow the escape of considerable quantities of gas; and even at larger works, where exhausters are employed under the supervision of competent men, this loss is something still to be considered and reckoned with. On the whole, Mr. Jerratsch's invention is well worth considering by those who either *must* (or still are so unwise as to) continue the use of horizontal retorts. These last words may call for some explanation, which the writer will anticipate and give right here and now. At this time, when gas companies are so closely pressed as never before to reduce prices, when material actually as a rule costs more, and labor is higher and more unreliable and peevish than ever in the history of gas manufacture, it does surely seem worse than senseless to let prejudice, jealousy or any other unworthy motive—wilful ignorance mostly—hold back owners of gas works, or their managing officers, from candid, unbiased investition of such well-tried, well-proved improvements in coal gas manufacture, as have been for the past 10 years, and stitl very much more recently been brought before the reading and otherwise progressive gas public. The hundreds of smaller gas works, where stoking machinery cannot economically be applied, but where skillful *and willing* operatives are almost impossible to get, should certainly, so it seems, be willing to employ a system of coal gas manufacture which would not only make them independent of any but ordinary labor, and at the same time considerably reduce the actual cost of manufacture. However, to those who will stick to the old great-great-grandfather's system of unimproved, horizontal retorts, despite loss and vexation which they could so easily avoid, the new retort construction of Mr. Jerratsch may be recommended, for consideration at least.

Irish Gas Selling Methods of the Past and Future.

[A paper read by MR. F. J. DAVIES at the August meeting of the Irish Association of Gas Managers.]

The up-to-date gas manager of to-day is a man of many and varied capacities. He is not merely concerned with the best way of making good and cheap gas. He is a seller of gas as well as a maker of it; and the ways and means of disposing of his make of gas are probably scarcely less important in his estimation, nor less frequent in his thoughts, than the more technical matters that lie in the course between the retort bench and the gasholder. At meetings like the present there is seldom any lack of interesting and helpful papers bearing on the manufacture of gas; and into that branch it would be equally foolish and presumptuous for a mere commercial man like myself to intrude—particularly before a body of specialists such as I have the honor to address. It is the other chief branch of the gas authority's business with which I may claim to be intimately acquain'ed—the perfecting of the present means of increasing the sale of gas and the developing of fresh methods for the same purpose; and it is in this connection that I am now venturing to briefly occupy your attention.

The original object of gas manufacture was, of course, for purposes of lighting; but it has long been recognized that while light is wanted daily for a few hours only, heat is in demand for many uses during all the working, and indeed all the waking, hours of the day. Hence the gas bracket and gasalier were soon followed by the gas stove; crude at first, but gradually evolved into the perfected appliances of to day; adapted to all requirements both for cooking and heating. I propose to recall in a sentence or two the progress that has been made, particularly in Ireland, during the last few years, in developing the sales of gas by means of gas stoves, and to follow this brief review by indicating the lines on which, in my opinion, that same development will most likely and most successfully advance during the next few years.

Ten years ago the number of gas stoves in use in Ireland was very small indeed. Unfortunately, no statistics are on record going so far back; but the fact will be readily confirmed by all those whose recollection goes as far back as 1895. At that time the position in England, while very far short of what it is now, was much in advance of that in Ireland. The reasons are simple enough. Gas was very dear in most Irish towns; most gas authorities made very high charges for fixing gas stoves, and the smaller authorities were not suitably equipped for economically running a gas stove department—including such work as the cleaning of returned cookers and so forth. But once the great practical advantage to the gas authority of taking up the stove business was realized, the Irish gas manager was no whit behind his English brethren in quickly grasping the situation and effectively dealing with it. About the year 1897, the new ideas began to make themselves felt, and the next year or two saw such an advance that, in 1900, the percentage of gas cooking stoves as compared with the number of consumers was a little over 14 per cent. In the same year in England and Wales the percentage of cookers as compared with consumers was 15.5. So that Ireland's 14 per cent. makes a good second, while Scotland lags behind with under 6 per cent. The figures were:

	Consumers.	Cookers.
England and Wales....	4,029.004	624,787
Scotland.....	571,788	33,794
Ireland.....	86,361	12,335

By the time another 5 year period had elapsed—namely, 1905—the further development of the figures showed that Ireland's percentage of cookers to consumers had largely increased—viz., from 14 to 24.2 per cent. But good though this degree of progress may be, it has failed to keep pace with the advance in either division of the sister island during the same period, for England's 15.5 per cent. of 1900 has grown to 36.6 per cent. (much more than double) in 1905; and Scotland shows 11 6 per cent., or nearly double its bare 6 per cent. of 1900. The exact figures for 1905 are as follows:

	Consumers	Cookers.
England and Wales....	4,877.437	1,787,490
Scotland....	699,171	80,934
Ireland.....	134,277	32,452

Look at the figures another way. In the 5 years ending 1905, England has added to its consumers 848,433, or an advance of 21.5 per cent., while it has increased the number of gas cookers in use by 1,162,703, or an advance of no less than 186 per cent. Scotland has added to its consumers 127,383—an advance of 22 per cent. (just ½ per cent. over the English percentage), and has increased its gas cookers in use by 47,140, or an advance of 139 per cent. Ireland has added 46,916 consumers, or an advance of 53.7 per cent., and has in use 20,117 additional cookers, or an advance of 163 per cent. In other words, while Ireland in 5 years has more than doubled the number of her consumers, she has more than trebled the number of gas cookers in use This sounds very well, but in comparing the rates of increase, I need hardly remind you that a very important point is the figure we start from. In the case of Ireland, we started with so low a figure that the doubling or even trebling of it does not mean a very huge one; and the fact that Ireland has only 24.2 cookers per 100 consumers, while England's percentage is 36.6 (or half as many again) proves, as I think you will all readily agree, that in Ireland there is still room for a vigorous campaign to further develop gas sales in this direction.

As regards the methods that should characterize such a campaign, most of these are already well known by experience. The progress made up till now, as indicated by the figures I have given, is due to the foresight and effort of a number of the leading gas authorities in Ireland, and these efforts have followed the usual lines. There has been a steady reduction in the price of gas in most towns, in some cases a special reduced rate for gas for use with stoves, and there have been the usual arrangements in most instances for placing out cookers on hire purchase—and much better for all parties—on simple hire, with in some cases free fixing as well.

The present state of development in the use of gas cookers, great and progressive though it is, has yet, I believe, a very great future before it. Even in England, with 36 per cent. of its consumers using gas cookers, this business has yet far to go, for I hold that practically every domestic gas consumer ought, in his own interest, do his cooking by gas. And if England has still far to go, Ireland, with its 24 per cent., has even further. The business in slot cooker and lighting installations is now growingly popular both with gas authorities and consumers all over the land, and it is responsible for great developments in the business done by an increasing number of gas authorities both large and small. In one moderate sized town, for example, some 6,000 installations have been put in during the past 4 years, and the work still goes steadily on. The slot meter and its sister apparatus the slot cooker have conquered whole provinces of territory for the gas authorities and brought under their control whole regiments of subjects—I should say consumers. It has done this largely owing to the peculiar conditions prevailing in the trade—conditions which are highly favorable and eminently safe for the gas authority.

So much for the past. Now let us deal for a little with present conditions and future prospects. The figures I have given you deal with

cookers only, for the reason that there are no figures available regarding other gas apparatus. Considerable progress, however, has been made by gas authorities in England in recent years in developing the trade in gas heating stoves of various types. In Ireland the gas heating business has only just begun to make progress. What progress has been made on this side of the Channel and the other is the result of the enterprise of certain gas authorities who have recognized the possibilities of gas heating apparatus in developing gas sales, and have seen it to be well worth their while to meet their consumers liberally in the way of providing them with such apparatus. It is also, if I may be permitted to say so, due in its degree to the exertions, in the way of advertising, by the various firms manufacturing these goods.

Now, gentlemen, what are to be the conditions of the gas stove business in the next 10 years—particularly on this side of the Channel? A well known statesman used to say, "Never prophesy unless you know." I am not a prophet nor the son of a prophet, and I do not pretend to know; but there are two things which we, whose interests are bound up with the gas industry, can do as regards the future. In the first place we can make up our minds what ought to be, and in the next place we can set ourselves to make sure that what ought to be will be.

The Irish gas consumer particularly ought to use gas both for cooking and heating as well as lighting. I need only point to the high prices ruling in Ireland for good house coal to show how clearly this will make for economy in the consumer's interest. Already a healthy and steady demand for domestic gas appliances has set in in Ireland, and there is no reason why a very large business should not be done in the near future. The indispensable factor in the situation is the gas authority. Whenever a gas authority sees how much its interest is bound up with this development it acts, and speedy success follows. Where does its interest come in? As regards cookers, the question is beyond the need of any reply—the facts speak for themselves.

There is one point further in regard to cookers to which I should like to make passing reference. While the last few years have witnessed a great development of gas selling through the general adoption of the cheap slot cooker, and the putting out of these by many gas authorities upon their districts on nominal terms, and while there yet remains a vast field to be exploited in this direction, I have long felt that there is another class of consumer whose requirements in the way of cookery are of a more elaborate description—calling for the highest grade of cooking apparatus with its greater capacity and variety of appliances. While obviously this class is much less numerous than the one catered for by the slot cooker, yet, on the other hand, it has to be borne in mind that, so far as the gas authority is concerned, a much larger quantity of gas is used per consumer, and at the same time the consumer is of a much more reliable type; and in any case there is, of course, far less trouble to the gas authority in selling a larger quantity of gas to a smaller and more reliable body of consumers.

As regards gas heating stoves, let it be remembered that while "one house one cooker" is a maxim that can hardly be improved upon, no such limit applies to gas heating stoves. There is already a variety of apparatus suited to every house, to every apartment, to every condition and to every pocket. A gas authority can speak with a degree of weight which a mere maker or seller of stoves cannot command. They can prove to their consumers the economy of gas fires; they can advise them as to the choice of stove for each apartment, and they can use their great local influence to get house builders to make provision in every apartment for gas heating. They also can, and I hold should, cultivate the interest and confidence of architects to a degree which has not hitherto been generally attempted, persuade these gentlemen as to the great facilities offered to their profession by the new types of gas heating apparatus, and induce them to see the advantage of specifying this class of gas apparatus for buildings, both domestic and public, which they may be at the time designing.

Have any of my audience ever put to themselves the question, "Why should there not be slot gas fires as well as slot gas cookers?" True, there are many gas fires in the market at low enough prices; but their heating power has been as low as their price. The gas fire of the future, I firmly believe, will be a fire as cheap in proportion as a slot cooker, but which—though, like the slot cooker, not professing to have the luxuries of detail found in the high-class stoves—will give good practical results on a lower scale of consumption than the more costly gas fires. Given such an apparatus at such a low figure, gas authorities will then have the golden opportunity within their grasp. Let them place such a fire broadcast among their consumers on as easy conditions as the more advanced of them place slot cookers at present—not one stove to every house, but one stove to every room—let them include one or two such slot fires in every installation they fit up, and gas sales will mount up with wings. I believe a slot gas fire is bound to be one of the leading features of the gas industry in the immediate future. I have no doubt that the appearance of such a stove will be awaited by the gas trade with interest and greeted with enthusiasm; and one may safely predict that round it will center a new development in gas heating in a direction and upon a scale hitherto unthought of.

Still dealing for a moment with gas fires, my experience is that at present the gas heating trade is practically over by Christmas. The general impression seems to be that the cold weather ends with December. I have gone to the trouble of making very careful researches in the Meteorological Returns, and perhaps it may be a surprise to some to learn that, instead of the last 3 months of the year being the coldest, the average temperature actually gets lower during January, February and March—not a little lower, but a good deal lower.

Mean Temperature for the Last 18 *Years, as Recorded for the Midland Counties of England.*

Jan.	Feb.	March.	Oct.	Nov.	Dec.
37.5	37.9	40.7	48.1	42.9	38.5

Year 1895.

	Jan.	Feb.	March.	Oct.	Nov.	Dec.
Dublin	36.4	33.7	43.1	49.4	44.2	42.2
Parsonstown.....	33.9	31.0	43.0	44.1	44.2	40.0
Valencia	39.6	37.0	45.1	48.9	47.4	45.8
Roche's Point....	39.0	36.9	44.9	49.1	47.7	45.1

Year 1900.

	Jan.	Feb.	March.	Oct.	Nov.	Dec.
Dublin	43.4	36.5	40.3	50.2	46.1	46.1
Parsonstown.....	40.3	34.3	38.1	47.8	42.8	44 3
Valencia	44.9	39.9	41.8	51.5	46.8	48.0
Roche's Point....	44.6	39.8	41.9	51.6	46.9	47.6

Year 1905.

	Jan.	Feb.	March.	Oct.	Nov.	Dec.
Dublin	43.8	43.8	45.3	47.4	43 2	47.2
Parsonstown.....	41.8	41.2	42.7	44.4	39.0	44.9
Valencia	46.2	44.8	45.1	48.4	44.1	47.8
Roche's Point....	45.2	44.2	45.0	48 2	43.6	46.9

The figures in the table I have had prepared bring this out clearly; and it will be seen that I have not only given the general figures for England, but those taken at the Irish observatories. All tell the same tale. The importance of the bearing of these statistics cannot be exaggerated. They show clearly that, instead of folding our hands by Christmas time, as if the heating stove demand were over, we should be at the height of our effort in this line. January, February and March ought to see large numbers of heating stoves being placed; and the cold spring months should witness some of the largest sales of gas for heating purposes. On this point, a word to the wise (in other words, to the gas authorities) will, I hope, be sufficient.

But it is not only in domestic heating that the future lies so largely with gas. Its use for heating every variety of warehouses, shops, offices and public buildings has made remarkable progress; and in time to come it promises to attain truly vast proportions. This development centers to a large extent round the gas heated radiator, which was introduced in its early form by a well-known firm of makers some 16 years ago, and has since been steadily developed in a succession of similar apparatus from the same source. The gas radiator has long enjoyed a wide popularity for heating premises of the classes I have mentioned; and in its latest evolution, the gas steam radiator, there is no limit in this direction to its uses and prospects. Appliances of this class are in use in the Houses of Parliament, in Smith's bookstall premises throughout the railways, H. M. Office of Works, the Mansion House, H. M. Inland Revenue Office, the General Post Office, St. Martin's-le-Grand, the Corporation of the City of London, Scotland Yard, the Guildhall, Royal Albert Hall, London College of Music, Ye Mecca Cafés (at all branches), the Pavilion, Lyric, Royalty, Haymarket, and Terry's Theaters, and very many leading churches, banks, insurance companies, and wholesale premises all over the country.

With so perfected an apparatus, the old objection to flueless gas stoves, for example, becomes meaningless; and it is really time we heard the end of it. The automatic gas valve, with its minimized consumption, insures both the lowest amount of combustion products in the apartment, and the lowest fuel cost. It is an interesting fact that

to heat any building in this way, burns less gas than is generally required to light it with the ordinary incandescent burners; and yet people would never dream of objecting to gas lighting appliances because they have no flues. Add to these points the further fact that—as Sir Oliver Lodge, the well known scientist, has repeatedly pointed out—the general prevalence of gas heating would go far to cure the fog nuisance in large towns, and I think it will be agreed that gas authorities can make an excellent case for the adopting of such apparatus by their consumers, and may well consider seriously the letting out of such apparatus. A gas steam radiator is the longest lived gas stove in existence. Its life is precisely, broadly speaking, that of an ordinary steam boiler. It is practically indestructible; and I do not know of one such apparatus having yet required repair through wear and tear.

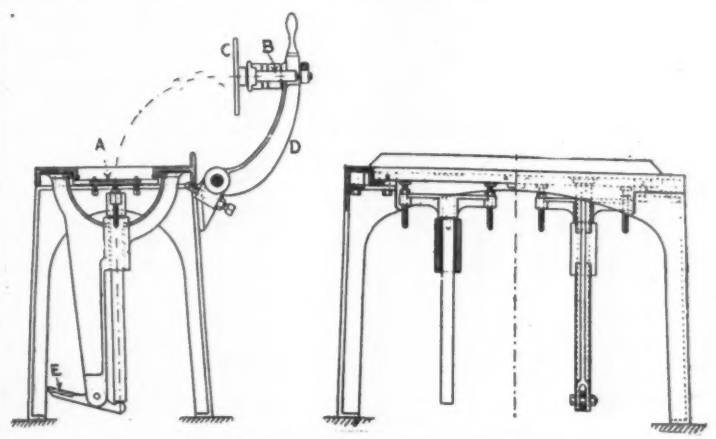
Then the principle of the automatic gas valve has now been applied to the circulating gas heated boiler; and here another wide and fresh field is opening up. I need only allude in a word to the objections that have hindered the progress of the geyser, or instantaneous heater. The quantity of gas needed to heat so much water in so short time naturally involves great expense for gas, and a large output of combustion products into the atmosphere; and as these appliances are usually fitted in very small rooms—such as bathrooms—this class of heater has not inspired general trust. But if you are not going to have the instantaneous principle, you must have the automatic principle; for anything that needs the gas to be turned up or down by hand will either be never ready to supply hot water when wanted, or the turning down of the gas will soon be found too great a bore, and the full flame will go on all the time, simply wasting gas. To give a full flame till the whole water is heated, then automatically turn it down till just high enough to maintain the temperature, turn it up automatically the moment any water is drawn off, and down once more when the temperature has again been levelled up—that is what all gas water heaters of the future should do. With such an apparatus, requiring only 7 cubic feet of gas to keep 20 gallons of water at a heat of 150°, the gas authority can go not only to builders and occupiers of private houses, but to restaurants, public and railway lavatories, fire brigade stations, hairdressers' shops, etc., and offer the very thing that is required for such places. Needless to say, every 1,000 feet of gas used in this way is a clear addition to any gas authority's output.

There are many special gas appliances made by the various stove makers—such as appliances for laboratories, workshops, tailors' shops, bakers' shops, laundries, hotels, and so forth—in which I suggest greater interest might be taken, and more effort made to spread their use. Indeed, I think I may venture to claim on behalf of the various firms connected with the stove making industry, that they have not been lacking either in inventiveness or enterprise, and that, with the wide range of apparatus now available for so many uses, and appealing to such a variety of present and possible consumers, there is plenty of room for a far larger extension of the gas industry in many directions than has yet been attempted; and when there is added to this such fresh advances in apparatus as I have ventured to foreshadow, I believe that the next 10 years will witness a degree of progress such as will astonish the faint hearted and exceed the hopes of the sanguine, so unbounded is my faith in the future of the gas industry.

Certain conditions, however, are essential. The sellers of gas and the sellers of gas consuming apparatus must continue to co-operate in fostering the business. Enterprise must reign; large views must be taken; gas must be cheapened wherever possible; and gas apparatus must be put out on the districts such as will enable every consumer to burn the last foot of gas he can profitably use. The gospel of gas and its many uses must be proclaimed in public and in private, in season and out of season—in fact, it never is out of season; and the public must be taught that gas was never half so widely useful in the past as it is going to be in the next 10 years.

Reinforced Concrete Shingles for Roofing.

Engineering News, in referring to the numerous applications of cement and concrete to the manufacture of building material, notes that one of these is the getting out of shingles for roofing. Special machines (operated by hand or by power) are being built by Wickes Bros., of Saginaw, Mich., for the manufacture of such shingles. These machines make not only the plain shingles but also those for hips and ridges, etc., and all of them have steel reinforcement, which prevents their falling to pieces even if they should crack. The accompanying cut shows a cross section of the hand machine, which makes two



Hand Molding Machine for Concrete Shingles.

shingles at each stroke. Two or three reinforcing wires are set in place lengthwise, also the nailing loops and eyes (fitting recesses in the mold). The mold at *A* is then fitted with concrete. This is tamped by means of the handles *B* on the tamping plate *C*, carried by the hinged bar *D*, and pressure on the treadle *E* then raises the pallet clear of the mold. The shingle is then removed with the pallet and placed on a rack for at least 24 hours.

The power machine is for continuous operation and has a long table at each end, the entire length being about 45 feet. A belt, conveyor chain and sprockets extend the entire length of the table so as to make a continuous loop of molds. At the entering end a boy places a pallet in the mold and covers it with a piece of tissue paper to prevent the concrete from adhering to the pallet. Another boy sets the reinforcement in place. As the mold passes under a hopper the proper amount of concrete is dropped into it and is tamped as the mold passes under the tamping rolls of the machine. Beyond these are 5 trowels which smooth and glaze the surface of the shingle. The mold then travels along the delivery table, where a boy removes the pallet and shingle and sets them on a rack, while the mold travels back to the head of the machine.

The plain shingles are 8 by 16 inches, ¼ inch thick at the butt and tapering slightly towards the top. They may be of various shapes and of any desired color. The concrete is composed of 1 part of Portland cement to 2½ parts of clean, sharp sand; these are mixed dry, and water is then added to make a stiff paste. The steel reinforcement may be of copper or galvanized steel wire, No. 16 for the transverse pieces and No. 20 for the lengthwise pieces and the loops at each side through which the nails are driven. The shingles must remain on the pallets for at least 24 hours; they are then carefully removed to the yard racks where they are kept for about a month, being kept moist by sprinkling during the first few days. The shingles are not fastened rigidly to the roof, so as to allow for contraction and expansion and for the action of ice. The hip and ridge shingles are not only reinforced lengthwise but also crosswise, and before the shingle is taken out of the mold it is slightly cut so that it can be bent to the desired angle, the crosswise reinforcing holding it in position. The hip shingles have the corners cut off to suit the courses of the roof shingles, thus exposing the ends of the reinforcing wires, which are bent into loops to receive the nails. All the cracks made in the hip and ridge shingles are filled with cement by the roofers. A number of roofs (old and new) have been covered with these shingles, and each roof is said to be guaranteed for 25 years by the contractor.

World's Coal Production in 1905.

In keeping with the great industrial activity that took place in 1905, and is still in effect, the production of coal during that period met the demands of trade in a most satisfactory manner.

The complacent attitude with which coal mining is viewed by the general public is due to a realization of the fact that we are not nearing a possible exhaustion of our fuel resources. It is probable that devices and inventions will continue to be perfected and used to cause further economy in the consumption of coal; but the idea that anything will be able to displace coal as a fuel, or as a generator of power, is absurd. Coal will continue to be the heart of industrial progress for generations to come, and were it not for its wide distribution throughout the world, there could be a well founded fear of those who might use their power

of control of this commodity not only to check progress, but to cause intense suffering as well. It is needless to call attention to the disastrous results which follow a suspension of coal mining in only one or two sections of our country; what would occur after a general suspension is not difficult to imagine. For this reason the public have rights that neither capital nor labor should be permitted to jeopardize, and the encouraging phase of the question, at present, is due to the generally distributed ownership of our mines, although in recent years the tendency to consolidate interests has grown.

The coal production of the United States, which reached a total of 351,187,209 short tons in 1904, was still larger in 1905, the total being 388,772,167 short tons, a gain of 6.3 per cent.

The gain in coal production is steady in most of the world's fields. The production given in the following table is taken from statistics compiled for Vol. XIV. of *The Mineral Industry*, and for means of comparison is given in metric tons, the world's standard measure:

Coal Production of the World.—(In Metric Tons)

Countries.	1904.	1905.
Asia:		
India	7,682,319	7,921,000
Japan	11,600,000	11,895,000
Australasia:		
New South Wales	6,116,126	6,035,250
New Zealand	1,562,443	1,415,000
Other Australia	760,723	805,000
Europe:		
Austria Hungary	40,334,681	40,725,000
Belgium	23,380,025	21,844,200
France	34,502,289	36,048,264
Germany	169,448,272	173,663,774
Italy	359,456	307,500
Russia	19,318,000	17,120,000
Spain	3,123,540	3,199,911
Sweden	320,984	331,500
United Kingdom	236,147,125	239,888,928
North America:		
Canada—		
Western	2,619,816	3,183,909
Eastern	4,194,939	4,775,802
United States	318,275,920	352,694,110
South Africa	3,015,000	3,218,500
All other countries	4,250,000	4,550,000
Total	867,020,658	929,622,648

In most cases these reports are from official sources; in others they are estimated as closely as possible from shipping returns and other data. The increase in 1905, as compared with 1904, reached a total of 62,601,990 tons, or 7.2 per cent.; an important gain.

As may be noted from the table, the production of coal in France and Germany has substantially increased, while the output of Belgium and Russia has fallen off. The United Kingdom also produced more coal in 1905, and still remains the largest exporter of fuel. No other country can show such an increase in production as the United States, and from present outlook, the wonderful development that has been taking place is likely to continue.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

829,518. Apparatus for producing gas. Walter A. Fourness, New York City.

829,541. Gas producer. Joseph G. Nash, Adelaide, South Australia.

829,651. Gas producer. Wm. B. Hughes, Philadelphia, Pa.

829,700. Gas purifying apparatus. Michel Drees, Aplorbeck, Germany.

829,751. Gas controlling device for incandescent and other gas lamps. Frederick A. Andrews, London, England.

829,761. Igniter for gas lamps. Rudolf Blumenfeld, Cleveland, O.

829,872. Method of effecting chemical action in gases. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor, by mesne assignments, to Atmospheric Products Company, same place.

829,873. Apparatus for subjecting gases to high tension discharges. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor to Atmospheric Products Company, same place.

829,874. Method of effecting the combination of gases. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor to Atmospheric Products Company, same place.

829,875. Apparatus for effecting chemical action in gases. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor to Atmospheric Products Company, same place.

829,876. Process for effecting chemical action in gases. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor to Atmospheric Process Company, same place.

829,877. Apparatus for effecting chemical action in gases. Dimmitt R. Lovejoy, Niagara Falls, N. Y., assignor to Atmospheric Products Company, same place.

829,919. Apparatus for producing power gas. Ludwig Hertzog, Berlin-Sudende, assignor to the firm of Adolph Saurer, Arbon, Switzerland.

830,015. Apparatus for generating gas. Melville D. Shaw and Wm. P. Rhody, Wapakoneta, O.

830,017. Gas meter. Frederick Smith, Camden, N. J.

830,092. Device for intermittent gas lights. Charles Matthews, Jr., and Ernest E. Laun, Chicago, Ills.

830,225. Testing gaseous mixtures. Fritz Haber, Karlsruhe, Baden, Germany, assignor to the firm of Carl Zeiss, Jena, Germany.

830,248. Appliance for storage vessels for liquid gases. Ludwig von Orth, Berlin, Germany, assignor to Deutsche Schiffs Feuerloschgesellschaft mit beschrankter Haftung, Bremen, Germany.

829,060. Device for automatically regulating the supply of steam to g s producers. Joseph Delassue, Paris, France.

829,104. Lamp. Robert M. Dixon, East Orange, N. J., assignor to the Safety Car Heating and Lighting Company.

829,105. Process of regulating the temperature of combustion in gas producers. Henry L. Doherty, Madison, Wis., assignor, by mesne assignments, to Combustion Utilities Company, New York City.

829,136. Safety attachment for gas burners. Stephen M. Blodgett, South Lincoln, Mass.

829,269. Time gas valve controlling mechanism. John Gunning, Bornemouth, England.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

GENERAL MANAGER E. H. GIMPER, of the Spokane Falls (Wash.) Gas Light Company, is to be congratulated over the fact that the increase in business has obliged it to seek new trading quarters. These are located in the business heart of the city, at Nos. 17 and 19 Monroe street, and there the Company will hereafter conduct its sales and instruction department. The shops—for such they really are—have been fitted up to the best advantage for serving the purposes in view, and Manager Gimper is satisfied that the returns from "the shops" will more than reimburse the Company for its expenditure thereon; and the expenditure was by no means an inconsiderable one. Of course, the sales and instruction department are entirely separate from the Company's general offices.

"G. L. J.," can obtain any desired information respecting the Lynchburg (Va.) Gas Company, by writing to Mr. Frederick H. Shelton, care Fourth Street National Bank, of Philadelphia, Pa.

MR. HARRISON O. WILBUR, for many years connected with the gas interests of Baltimore, Md., died at his home in that city the morning of the 31st ult. He was born in Boston, Mass., March 31st, 1824, and removed to Baltimore in 1866. He was President of the Fort Avenue Savings Bank, and had been prominently identified with that institution since 1876. His widow survives him, as do 4 sons and 1 daughter.

THE Massachusetts Board of Gas and Electric Light Commissioners will be in session on the following days to take testimony in the following cases: Sept. 11th.—On the appeal of the Boston Consolidated Gas Company from the decision of the Chelsea Board of Aldermen in giving the Company the right to withdraw on its petition for the right to construct, operate and maintain a pipe line in certain streets in the city of Chelsea. Sept. 12, 10:30 A.M.—A hearing to all persons interested in the resolution passed by the last Legislature to "provide for an investigation and report by the Board of Gas and Electric Light Commissioners to the equipment of gas fixtures with self-closing devices." At 2 P.M. on petition of the Greenfield Electric Light and Power Company for an approval of an issue of additional capital stock, to the amount of $65,000, the proceeds to be used to reduce the floating debt of the Company. Sept. 13th, 10:30 A.M.—Petition of Cambridge Gas Light Company for approval of an issue of capital stock, to the amount of $100,000, the proceeds to be used for paying the cost of additions to the plant. Sept. 14th.—Petition of Lowell Electric Light Corporation

for an approval of an issue of additional capital stock to the amount of $325,000, the proceeds to be used for reducing the floating debt of the Corporation, and for paying the cost of additions to the plant.

EX-MAYOR WEED, of Newton, Mass., who was appointed a member of the Board of Gas and Electric Light Commissioners, succeeding Commissioner George, of Haverhill, has qualified for his duties as Commissioner.

THE Youngstown (O.) Consolidated Gas and Electric Company will expend $12,000 in enlarging and fitting the premises on East Boardman street for the purposes of its general offices.

MR. GEORGE W. BRIGGS, for some time in charge of the gas division of the properties of the Westerly (R. I.) Gas and Electric Light Company, has resigned that position in order to accept a responsible position with the Saginaw City (Mich.) Gas Company.

THE fraternity will sorrow with Mr. Howard Bixby, Manager of the gas division of the Green Bay (Wis.) Gas and Electric Company, over the bereavement that recently came to him through the death of his father, who passed away at his late home in Ironton, O., the 22d ult.

THE proprietors of the Freeport (Ills.) Gas Light and Coke Company will hold a special meeting next Thursday to consider the setting aside of $20,000, which sum will be expended in enlargement and betterment. The scheme provides for a plant up to double the capacity of the existing one. There is little doubt that the plan will be assented to.

THE squib issued from "the press" of the St. Paul (Minn.) Gas Light Company has to do with the "Top Burners of the Gas Ranges." The illustration virtually tells the story, but the short sentences descriptive of the functions of the burners clinch the understanding there completely.

THE Ashland Gas, Sewer and Water Company, of Ashland, Va., has been incorporated by Messrs. J. F. Howison, Isaac Diggs, W. L. Fry, John D. Harris and Samuel H. Pulliam. The President is the first named, and his headquarters are in Ashland.

A CORRESPONDENT in Detroit forwards the following newspaper clipping from a recent issue of the *Journal* of that city: "Colonel E. G. Pratt, the retiring Manager of the Detroit City Gas Company, in all probability remains in Detroit and the gas business. 'I am interested in some independent gas companies in Iowa,' said Mr. Pratt a day or so ago. 'They are small properties now but capable of development, and I can look after them as well from Detroit as any other place. Then there is a growing field for a consulting expert in gas property construction and management, and Detroit is as central a location as I know.'"

THE Greenville (Ills.) Gas Company has been incorporated by Messrs. D. Heyde and A. D. Dunn, and Mrs. M. Hyde. It is capitalized in $30,000.

THE officers of the Twin State Gas and Electric Company, the incorporation of which concern at Hartford, Conn., was reported last week, are as follows: President, William M. Wherry, Plainfield, N. J.; Vice-President, W. C. Pratt, New York; Secretary and Assistant Treasurer, H. G. Villard, Dobbs Ferry, N. Y.; Treasurer, George C. Martin, New York.

THE Sheboygan (Wis.) Gas Company's main system is being added to. The Company reports brisk business, and its proprietors are not neglecting any opportunity to increase it.

MR. J. T. O'ROURKE and associates, of Yazoo City, Miss., have applied for a franchise to govern the operation there of a gas plant.

THE offices of the Boone (Ia.) Gas Company are being "done over."

A RECENT issue of the Boston (Mass.) *News Bureau*, had this to say respecting the output of gas in the Massachusetts business hives of Boston and Lynn:

"The extent of the increase in the consumption of gas in Boston, which is possible in consequence of the recent 15-cent reduction in price to 85 cents, is not generally appreciated. Some idea of the prospective growth in gas consumption in Boston may be had from a study of the effect of a similar reduction of gas prices in the city of Lynn. Last October Lynn reduced its price to 85 cents, making the second reduction in 3 years from the dollar mark. In this 3-year period the consumption of gas has increased nearly 40 per cent. This was reflected in increased profits for the Lynn Gas and Electric Company, the stock of which receives 10 per cent. a year and sells around $310 per share. The following table gives figures showing the consumption of gas in Lynn for the 4 years ended June 30, the percentage of increase and the prices charged:

Year.	Output, Cubic Feet.	Per Cent. Increase.	Price.
1903.....	284,000,000	....	$1.00
1904.....	320,642,500	13.47	.90
1905.....	358,776,700	11.89	.90
1906 (estimated)....	400,000,000	11.00	.85

"The Boston Consolidated Gas Company, while it has shown a very large increase, should show a still larger increase as the winter months approach. The month just closed showed an increase of a little less than 10 per cent., which is noteworthy for a warm month. The percentages of increase in the past 3 months in Boston compare with the increase of these months last year, as follows:

Month.	1906. Per Cent.	1905. Per Cent.
June.....	16.6	...
July.....	13.7	4.1
August.....	10.0	9.7

"The Boston Consolidated Gas Company should easily show a 10 per cent. increase in gas consumption in the present fiscal year, which will bring the total above 3,500,000,000 feet."

WE understand that Mr. Emil G. Schmidt, General Manager of the Peoria (Ills.) Gas and Electric Company, will expend a sum not far from $250,000 on betterments to the gas division. The first thing to be done will be the construction of a holder to rest in steel tank.

THE proprietors of the Huntingdon (Pa.) Gas Company have reduced the gross selling rate from $2 to $1.50 per 1,000 cubic feet. They have also ordered a cut amounting to 25 per cent. in the rate for electric current.

MR. A. J. LOCKWOOD has been appointed General Manager of the Toledo (O.) Gas, Electric and Heating Company, vice the late Mr. Charles R. Faben, Jr.

MR. J. G. PATTON, formerly City Engineer of Tulsa, I. T., has been appointed Engineer of the Clancy River Gas Company, which has the franchise for supplying Muskogee with gas.

ONE would imagine, from the original press despatches reporting the affair, that the fire which occurred last August in the works of the Peoples Lighting, Heating and Power Company, at Barre, Vt., had about put the plant out of commission. It is true there was "a fire" in the Barre works on the date named, and the further fact is that the damage done was repaired at a cost of less than $100.

THE new net gas rate ($1.25 per 1,000 cubic feet) at Tacoma, Wash., has been effective since the first ult. The new water gas plant there will be in operation before the end of the current month.

The new gas plant at Palestine, Tex., is virtually completed,

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ACCORDING to the report of Mr. Elmer G. Runyan, Inspector of Gas and Meters for the District of Columbia, for the year ended June 30th last, all records were broken in the testing of gas meters, the report showing that 6,995 meters had been inspected and proved during the period noted. Under the law the office was required to collect a fee of 50 cents for each new or complaint meter examined, and 20 cents for each repaired meter, and the total amount collected on this account was $2,740.70. Concerning the photometric testing of gas supplied by the Washington Gas Light Company the Inspector stated that 882 such examinations were made at the three testing stations during the year, and that the gas gave an average illuminating power of 23.22 candles, or 1.22 candles above the legal requirement. The highest power observed during the 12 months was 27.19 candles, at the Southeast Washington station, December 21, 1905, and the lowest was 19.08 candles, at the central station, 10th and D streets northwest, on February 3, 1906. At no time during the year did the Inspector of gas and meters find the gas to contain more than the legal limit of such impurities as ammonias and sulphur. On account of the general and increasing application of gas in heating and cooking in recent years, the laboratory of the gas inspection office was equipped last year with apparatus for testing the calorific value, or heating power, of the gas. Both the Georgetown Gas Light Company and the Washington Gas Light Company during the year made extensive improvements in order to meet the growing demands upon their service.

THE Edison Electric Company, of Riverside, Cal., has informed the residents that the net selling rate will be put at $1 per 1,000 cubic feet, January 1st, 1907, provided that 200 new consumers are put on the lines between now and then. The existing rate is $1.25 per 1,000.

THE subscription by the Milwaukee (Wis.) Gas Light Company to what is known as the Auditorium fund has been increased from $2,000 to $3,500.

WE understand that the Childs-Hulswit Company has secured control of the properties of the Citizens Railway and Light Company, of Muscatine, Ia.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

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OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 33 Lime Street, London.

MONDAY, SEPTEMBER 10, 1906.

The Market for Gas Securities.

The opening quotations to-day (Friday) for Consolidated are the same as those of a week ago, which shows that the opinion of Justice Giegerich, in the instance of the mandamus proceedings before him, on reargument, had been anticipated and discounted. His ruling amounts to decreeing that the Consolidated Company must supply gas at 80 cents until the final adjudication is made.

Peoples, of Chicago, is steady, and it is being put away by strong investors. A dividend of 1¼ per cent. has been declared on the shares of the Massachusetts Lighting Companies. It is payable the 15th prox. The Laclede Company will pay on the 15th inst. its regular quarterly dividend of 1¼ per cent. U. G. I. Company shares are, so those in the know say, a purchase.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

SEPTEMBER 10.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid,*	*Asked.*
Consolidated	$78,177,000	100	139¼	140¼
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	101	104
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	..	105
Mutual	3,500,000	100	190	225
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	101	103
New York and East River—				
1st 5's, due 1941, J. & J.	3,500,000	1,000	108	111
Con. 5's, due 1945, J. & J.	1,500,000	..	104	110
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
1st Mtg., 5's due 1931, M. & N.	1,500,000	1,000	104	108
The Brooklyn Union	15,000,000	1,000	110	130
1st Con. 5's, due 1948, M. & N.	15,000,000		107	..
Yonkers	299,550	500	150	..
Out-of-Town Companies.				
Bay State	50,000,000	50	5/16	⅜
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	9	10
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	102	103½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,652,750	100	..	95
Preferred	3,026,500	100	107½	108
Consumers, Toronto	2,300,000	50	200	204
Consolidated, Baltimore	11,000,000	100	..	90
Mortgage, 6's	3,500,000	..	..	118
Chesapeake, 1st 5's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
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Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	550,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	5,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	107½	108¾
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co.	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	.	105
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	4,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Massachusetts Gas Companies of Boston	25,000,000	100	58¼	58¾
Preferred	25,000,000	100	88¼	88½
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	6,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	90½	91
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	100	..	..
St. Joseph Gas Co. 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96½	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,600,000	20	295	300
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600.000	50	220	..

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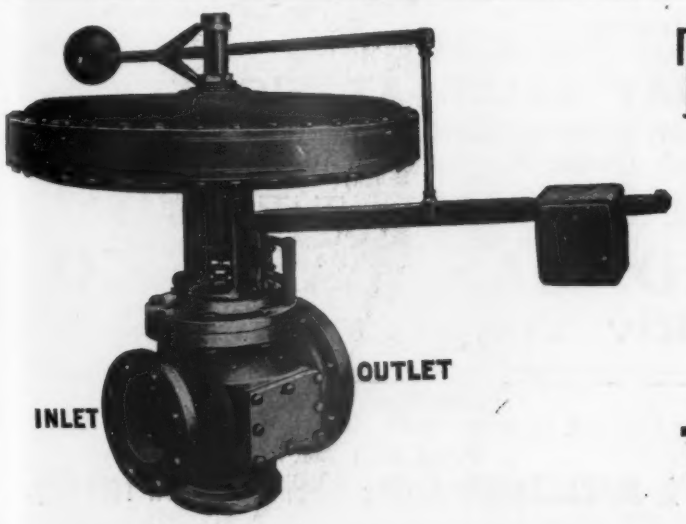

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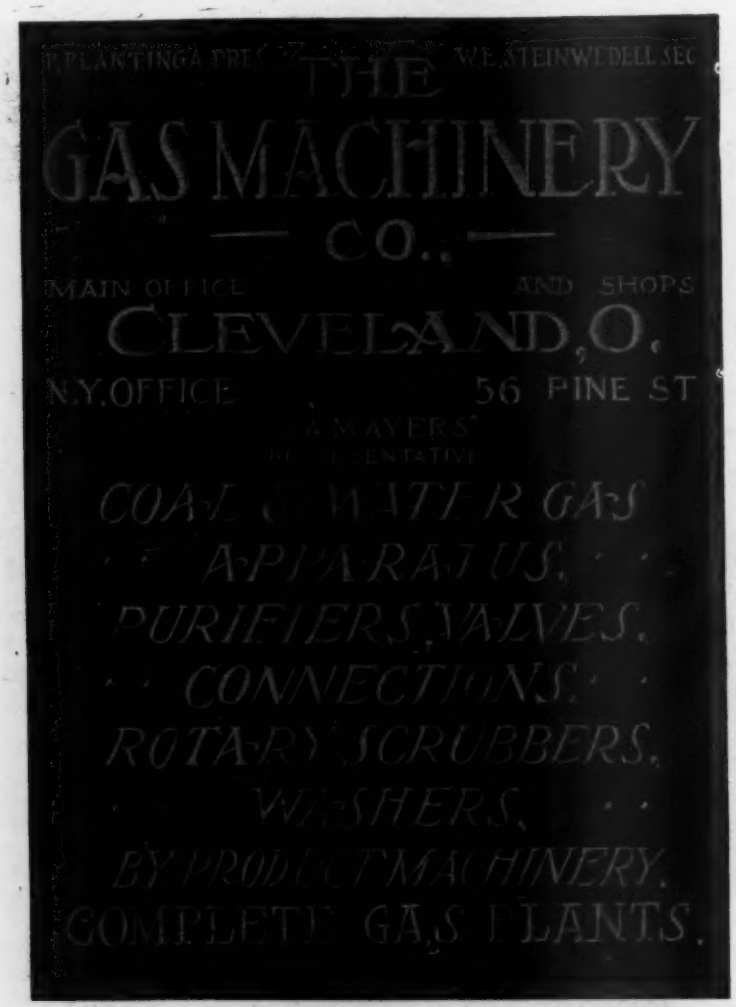

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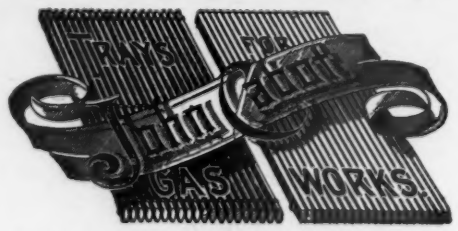

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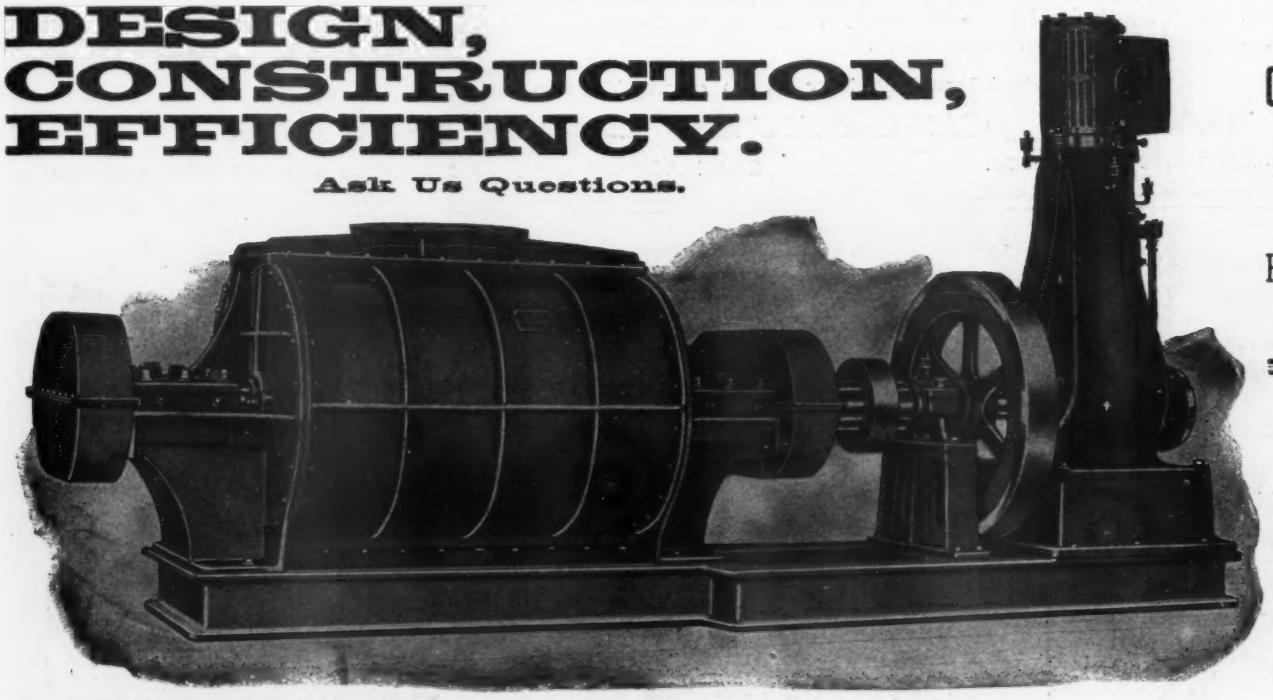

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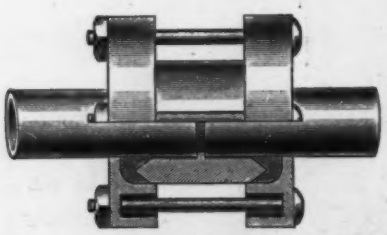

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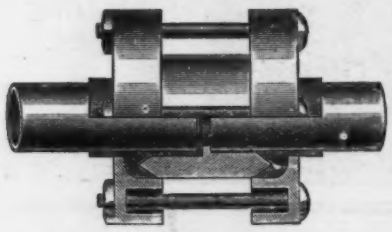

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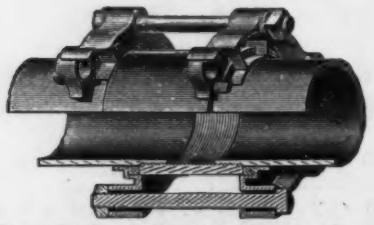

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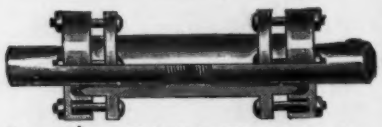

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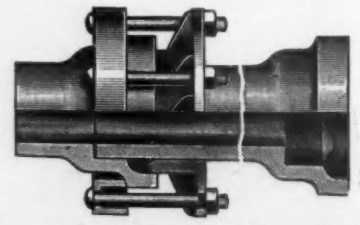

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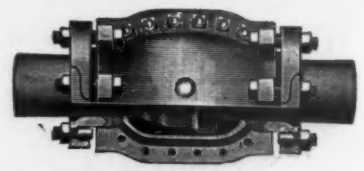

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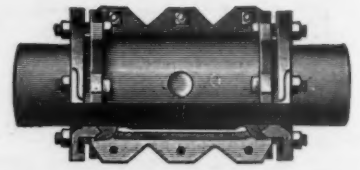

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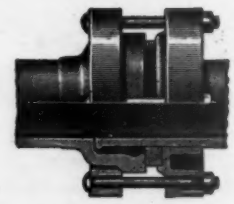

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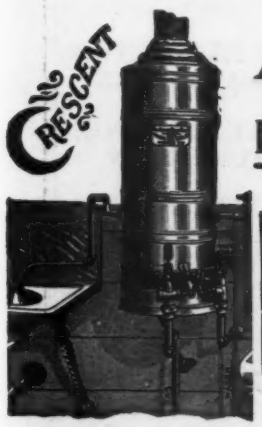

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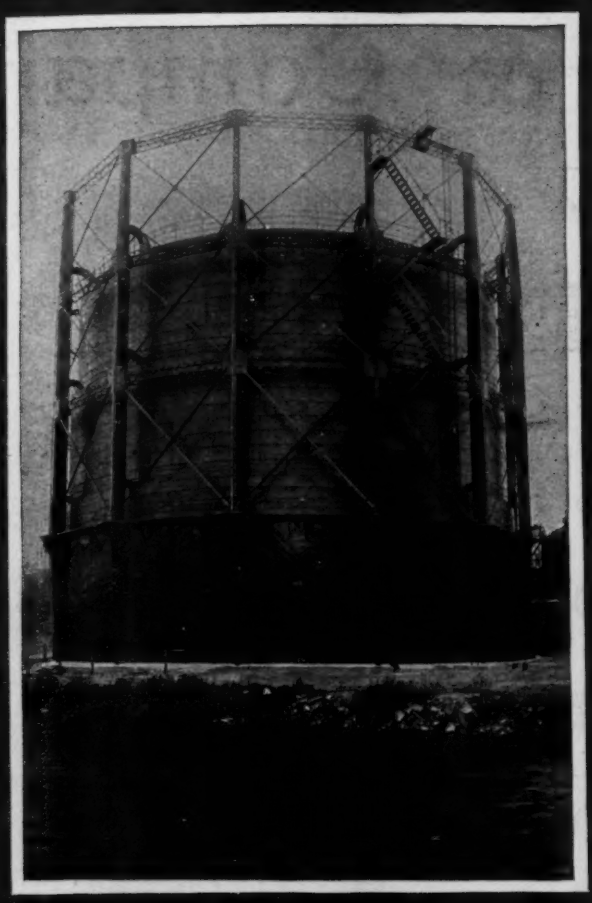

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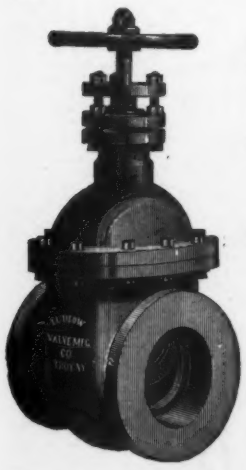

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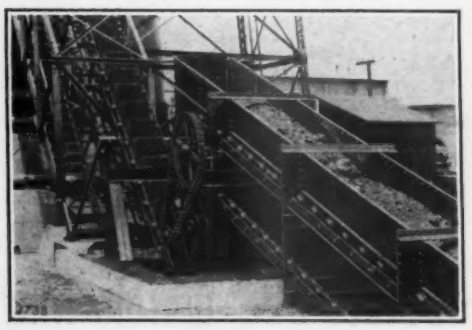

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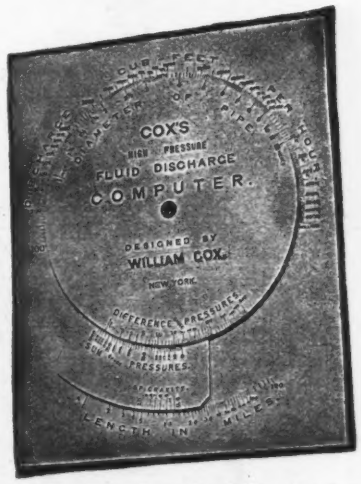


This Computer solves the following formula, which is applicable to Gas, Air and other elastic fluids, flowing through long pipes with high initial pressures:

Discharge in cubic feet per hour at atmospheric pressure $= 33.3 \sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$

Where

d = diameter of pipe in inches,

p_1 = absolute initial pressure in pounds per square inch,

p_2 = absolute terminal pressure in pounds per square inch,

L = length of pipe in miles,

w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;

(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;

(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and

(4.) Opposite any desired discharge will also be found the required diameter of pipe.

Price of the Computers, in Cloth Case, 6½ x 8 inches, $5 Each, Net.

For Sale by

A. M. CALLENDER & CO., 42 Pine Street, New York City.

The "Gas World" Analyses of Accounts of Gas Undertakings,

1904-1905,

Showing at a glance the Accounts of 113 Coal and Water Gas Companies, Itemized under

Coal Carbonized, Gas Made and Sold, Yield of Residuals, Public Lamps, Mileage of Mains, Consumers, Price of Gas, Illuminating Power, Financial Results, Revenue.

Manufacturing Charges, Rates and Taxes, Distribution Charges, Management Charges, Bad Debts, Capital Paid Up, Capital per Ton and per Thousand, Reserve Funds, etc.

EVERY GAS ENGINEER AND MANAGER SHOULD HAVE A COPY OF THIS INVALUABLE AND UP-TO-DATE WORK.

Price, $3. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

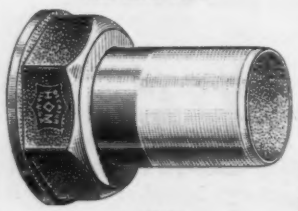
LLOYD'S SUBMERSION WASHERS.

Maximum Efficiency,
Minimum Back Pressure,
Complete Safety.

Western Sales Agent
BARTLETT, HAYWARD & CO., Baltimore, Md.

LLOYD CONSTRUCTION CO., Detroit, Mich.

FOR LEAD PIPE.



C—1048.

Mueller Gas Meter Couplings.

In using these couplings you do away with any possible chance of having to do your work over because of faulty or defective castings. They are thoroughly tested at the factory and are known beyond doubt to be free from anything that would render them unserviceable.

THE MARK OF UNCONDITIONAL DECATUR H⬡M ILL. U.S.A. GUARANTEE MUELLER GOODS

H. MUELLER MFG. CO.,
Decatur, Ill.,
U. S. A.
New York, N. Y.,
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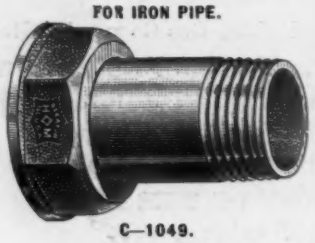
FOR IRON PIPE.



C—1049.

BINDER

FOR THE

JOURNAL.

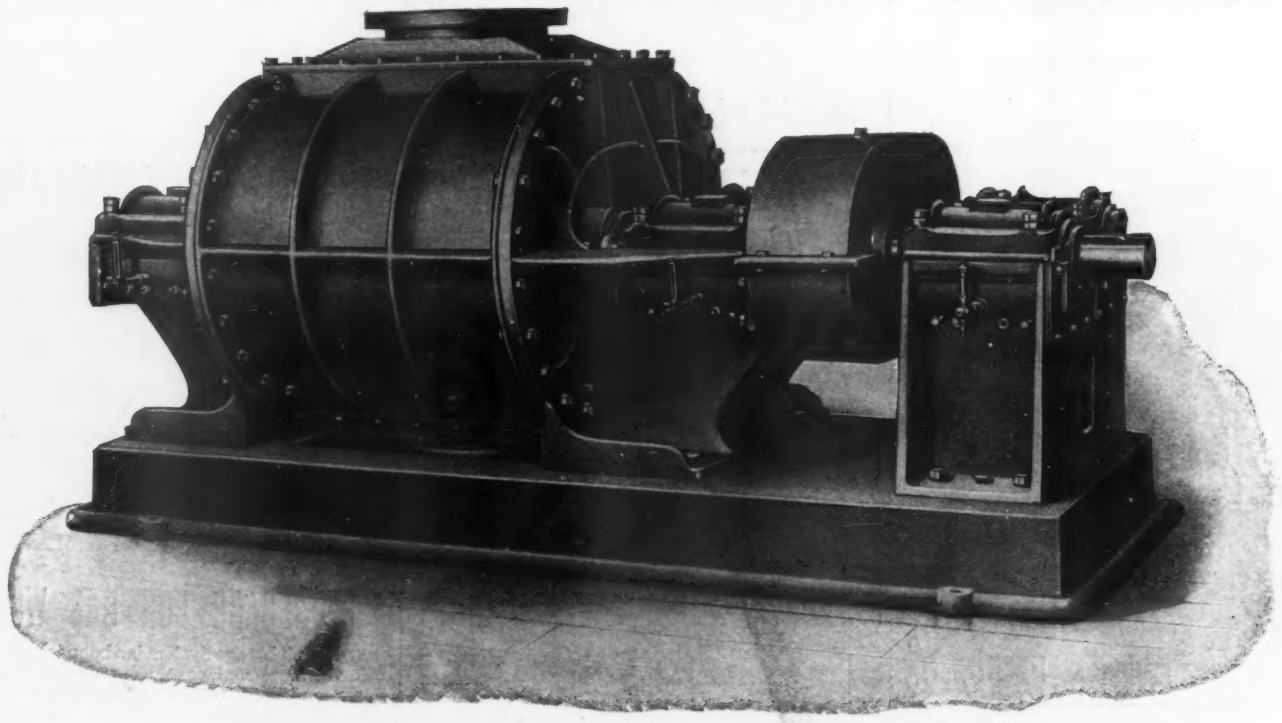
PRICE, $1.

FOR SALE BY

A. M. CALLENDER & CO., - 42 Pine St., New York.

ROOTS' EXHAUSTERS for HIGH and LOW PRESSURE WORK.

The highest efficiencies obtained. Most perfect devices for adjustment and maintenance of proper alignment. Use our flexible coupling to correct troubles caused by misalignment and engine shaft thrust. Our gas governor is the best. By-pass, gas valves and fittings.



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HOME OFFICE: Connersville, Ind. NEW YORK OFFICE: 120-122 Liberty St. CHICAGO OFFICE: 1547 Marquette Bldg.

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NEW ZEALAND INTERNATIONAL EXHIBITION,

To be Held During our Coming Winter at Christchurch,

Humphrey Gas Arc Lamps

Will Supply the Greater Share of

INTERIOR ILLUMINATION.

This is in the face of severe electrical competition, but the tender of the Christchurch Gas, Coal and Coke Co., Ltd., has been recognized as embodying the best features of high-class illumination as fully demonstrated in the commercial lighting of Christchurch.

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GENERAL GAS LIGHT CO.,
KALAMAZOO, MICH.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
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EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

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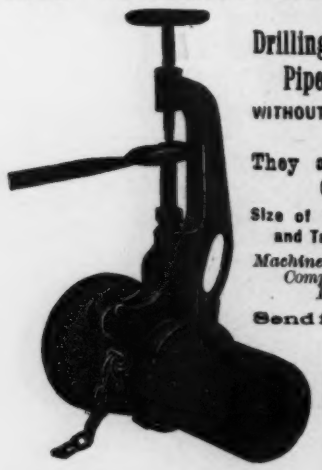

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,
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"THE MINER"
Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

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821-823 Eagle Av., N.Y.

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Plans prepared and Estimates furnished at short notice.

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Established 1856. Works at Phillipsburgh, N. J.

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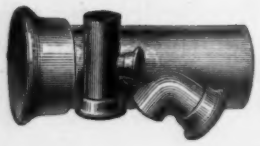


CAST IRON WATER AND GAS PIPE,

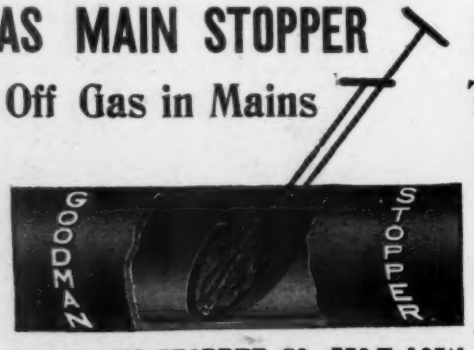
FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 552 E. 135th St., New York City.

Coke and ashes are handled in ton, and ton-and-a-half quantities at 1,000 feet a minute.

TELPHERAGE FOR GAS WORKS.

Our Telpherage System is a boon to gas works. For instance coal, coke, ashes—any material in any condition—can be handled at great speed, and with unapproachable economy because one machine and one operator do the work. The picture shows part of the plant we recently installed at the Lowell Gas Light Co., Lowell, Mass.

State your case—and ask for booklet 53.

UNITED TELPHERAGE DEPARTMENT
The Dodge Coal Storage Co.

Philadelphia—Hunting Park Ave. and P. & R. Ry.
New York—299 Broadway.
Chicago—39th Street and Stewart Avenue.
Pittsburgh—1501-2 Park Building.
Portland, Ore.—309 McKay Building.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

FIELD'S ANALYSIS
For the Year 1905.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 37th Year of Publication.

COMPILED AND ARRANGED BY **JOHN W. FIELD,**

Secretary and General Manager of The Gas Light and Coke Company, London.

PRICE, $5. FOR SALE BY

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

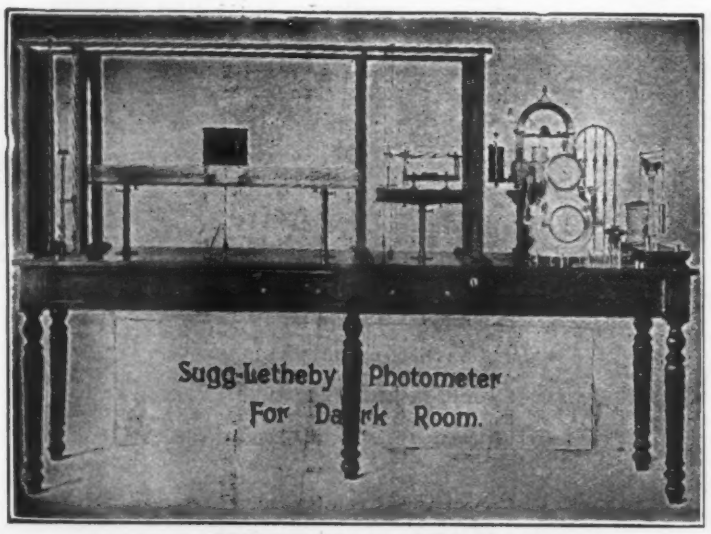
SEPTEMBER, 1906.

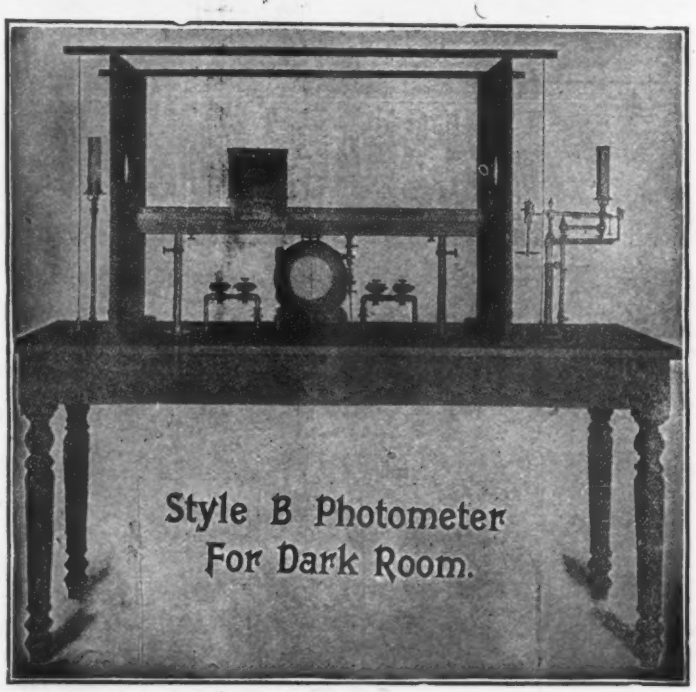
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Sat.	1	No L.	No L.
Sun.	2	No L. FM	No L.
Mon.	3	No L.	No L.
Tue.	4	7.00 PM	8.40 PM
Wed.	5	7.00	9.10
Thu.	6	7.00	9.40
Fri.	7	7.00	10.10
Sat.	8	7.00	10.40
Sun.	9	6.50	11.10
Mon.	10	6.50 LQ	11.50
Tue.	11	6.50	12.40 AM
Wed.	12	6.50	1.30
Thu.	13	6.50	2.20
Fri.	14	6.50	3.20
Sat.	15	6.50	4.40
Sun.	16	6.30	4.40
Mon.	17	6.30	4.40
Tue.	18	6.30 NM	4.40
Wed.	19	6.30	4.40
Thu.	20	6.30	4.40
Fri.	21	6.30	4.40
Sat.	22	6.30	4.40
Sun.	23	8.40	4.50
Mon.	24	9.30 FQ	4.50
Tue.	25	10.30	4.50
Wed.	26	11.30	4.50
Thu.	27	12.30 AM	4.50
Fri.	28	1.40	4.50
Sat.	29	2 40	4.50
Sun.	30	3.50	4.50

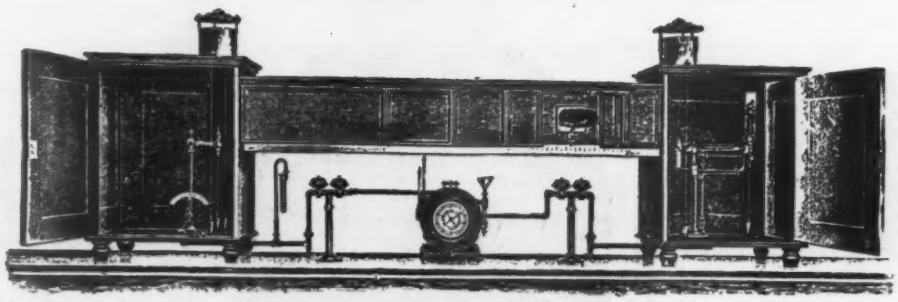
TOTAL HOURS DURING 1906.

By Table No. 1.

	Hrs. Min.
January	223.40
February	190.40
March	192.10
April	167.00
May	152.20
June	142.10
July	150.20
August	157.40
September	170.00
October	185.10
November	201.40
December	214.00
Total, yr.	2146.50







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

SEPTEMBER, 1906.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light	Extinguish.
		P. M.	A. M.
Sat.	1	6.30	4.20
Sun.	2	6.30	4.20
Mon.	3	6.15	4.30
Tue.	4	6.15	4.30
Wed.	5	6.15	4.20
Thu.	6	6.15	4.30
Fri.	7	6.15	4.30
Sat.	8	6.15	4.30
Sun.	9	6.15	4.30
Mon.	10	6.05	4.40
Tue.	11	6.05	4.40
Wed.	12	6.05	4.40
Thu.	13	6.05	4.40
Fri.	14	6.05	4.40
Sat.	15	6.05	4.40
Sun.	16	6.05	4.40
Mon.	17	5.55	4.50
Tue.	18	5.55	4.50
Wed.	19	5.55	4.50
Thu.	20	5.55	4.50
Fri.	21	5.55	4.50
Sat.	22	5.55	4.50
Sun.	23	5.55	4.50
Mon.	24	5.40	5.00
Tue.	25	5.40	5.00
Wed.	26	5.40	5.00
Thu.	27	5.40	5.00
Fri.	28	5.40	5.00
Sat.	29	5.40	5.00
Sun.	30	5.40	5.00

TOTAL HOURS DURING 1906.

By Table No. 2.

	Hrs. Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280 25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building
PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....

No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

THE NEW NO. 7 WELSBACH DINING ROOM FIXTURE.

PRICE, EACH, COMPLETE, WITH SHADE, FRINGE, MANTLE AND CHIMNEY, $14. PER DOZ., $150. DISCOUNT, 50 PER CT.

Standard Length, 30 inches.
The New No. 7 Welsbach Dining Room Fixture, when ordered, will be sent complete, as follows:

- 1 No. 7 Harp Fixture and Brass Crown finished in Brushed Brass.
- 1 No. 66 Welsbach Burner (high candle power).
- 1 No. 4 Pilot By-pass.
- 1 No. 4197 Mantle — Intensive Brand.
- 1 No. 306 Chimney (air hole).
- 1 Fourteen-inch GREEN Art Glass Shade, with six-inch Green Beaded Fringe.

VARIATIONS.

Finished in oxidized copper, oxidized brass, etc., 25 cents extra.

Shades in Ruby and Green--Ruby, Amber and other colors, without extra charge.

Special colors require a few days extra time to fill orders.

Green Shades will be shipped unless otherwise ordered.

This fixture is being largely used by Gas Companies as a dining room fixture at the popular retail price of $10 complete, and is a great favorite for moderate sized two and three-story residences. In popularity and price it is unequalled.

WELSBACH CO.,
Salesrooms in All the Principal Cities of the United States.
Factories:
GLOUCESTER, N. J.
CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

For the Six Months Ending July 1st, 1906, has been Awarded Contracts for 25 Sets of

Standard Double-Superheater Lowe Water Gas Apparatus.

PARTIAL LIST OF PLACES:

New Britain, Conn. (2d contract).	**Philadelphia, Pa.**	**Lewiston, Pa.**
Malden, Mass. (3d contract).	**Waterbury, Conn.**	**Greenville, Tex.**
Kirksville, Mo.	**Manchester, N. H.**	**New York,** Cent. Un. (3d contract).
St. Johnsbury, Vt.	**Allentown, Pa.**	**Jefferson City, Mo.**
Memphis, Tenn. (2d contract).	**Omaha, Neb.**	**Peekskill, N. Y.** (2d contract).
Council Bluffs, Ia. (2d contract).	**Muskegon, Mich.**	**Waterville, Me.**
Seattle, Wash. (2d contract).	**Nazareth, Pa.** (2d contract).	**Washington, D. C.** (3d contract).

TOTAL SETS TO JULY 1, 1906, = = = = = 618

TOTAL DAILY CAPACITY TO JULY 1, 1906, 488,930,000 CUBIC FEET.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
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FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

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FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
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CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

L. C. HAMLINK. President & General Mgr. AUGUST COURT. Secretary & Treasurer.

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SUCCESSORS TO
ST. LOUIS GAS CONSTRUCTION CO.,
DESIGNERS AND BUILDERS OF

COAL GAS BENCHES,

SPECIAL HIGH GRADE REFRACTORY MATERIAL FOR BENCH SETTINGS, WATER GAS LININGS, ETC.
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For Students in Gas Manufacture.
ELEMENTARY, ADVANCED AND CONSTRUCTIONAL.

Three Volumes. Price, $1.50 each. For Sale by
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Practical Photometry,
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Price, ... $3.00.
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Practical Handbook on
GAS ENGINES,
With Instructions for Care and Working of the Same,
By G. LIECKFELD, C.E.
Translated with Permission of the Author,
By GEO. M. RICHMOND, M.E.
Price, $1. For Sale by
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Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR.
Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by
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Successor to WILLIAM GARDNER & SON.
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BALTIMORE RETORT & FIREBRICK CO.
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Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,
All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

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Agents for New England States.

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RAIL and WATER CONNECTIONS to ALL POINTS.

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WORKS:
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GEROULD'S IMPROVED RETORT CEMENT.
A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.
Price List, f.o.b. PITTSBURGH, PA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
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C. L. GEROULD,
1200 Bank for Savings Bldg., Pittsburgh, Pa.

FIELD'S ANALYSIS FOR THE YEAR 1905.
An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 37th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by
A. M. CALLENDER & CO., 42 Pine St., New York City.

JOHN DELL, *President and General Manager.*
MISSOURI FIRE BRICK CO.,
ESTABLISHED 1882.
MANUFACTURERS OF
Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the Exclusive Agents *for the* Mitchell Patent Benches, *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* Rear Clinkering. The Mitchell *is the* Original Coal Firing Bench. *We also Erect Plain Benches with* One to Six Retorts.

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

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Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder.

229 BROADWAY, NEW YORK.

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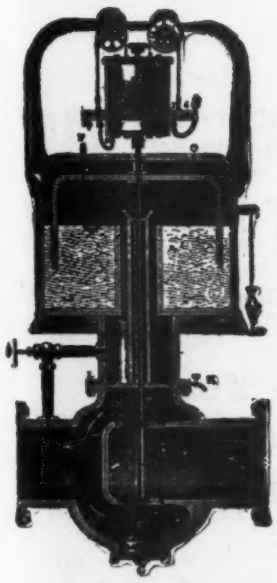

Design, Construction and Extension of

COAL OR WATER GAS PLANTS,

Automatic, Balance, High Pressure and Service Governors,

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material for Gas Purification, Jones Jet Photometers, Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM.

Reinforced Concrete Construction for all Purposes,

Wide Experience in High Pressure Installation and Extension.

GAS SPECIALTIES.

395 Broadway, New York.

295 West 22d Street, CHICAGO, ILLS.

PARKER-RUSSELL MINING AND MFG. CO.,

OF ST. LOUIS, MO.,

PROPRIETORS OF THE

OAK HILL GAS RETORT AND FIREBRICK WORKS.

ST. LOUIS OFFICE: 417 Pine Street. NEW YORK OFFICE: Aldrich Court, 45 Broadway.

WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

Half and Full Depth Benches of Our Own Design, Containing 6, 8 or 9 Retorts.

SLOPERS.—We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

We Build Benches Complete. Ready for Gas Making. Also,

RETORT HOUSES,

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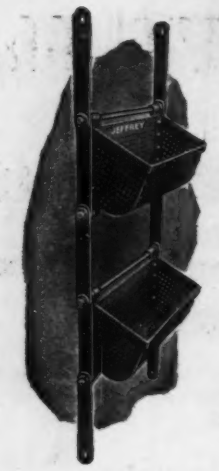

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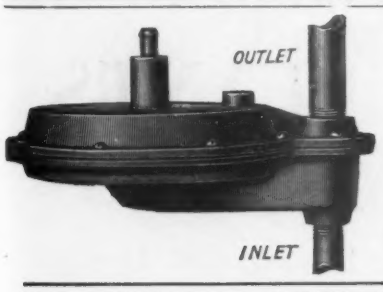

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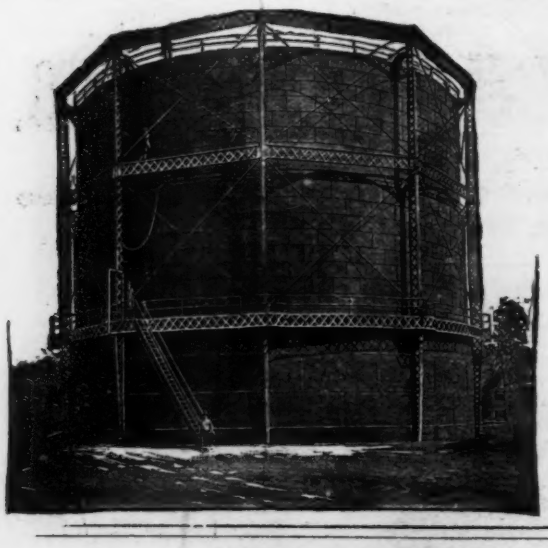

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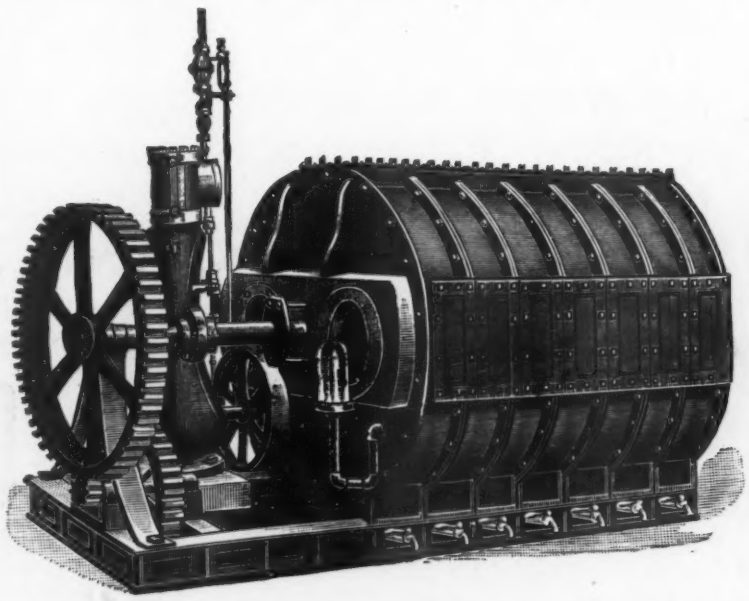

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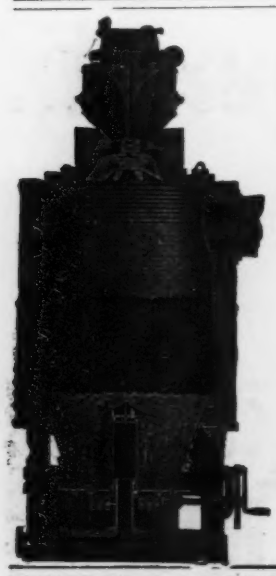

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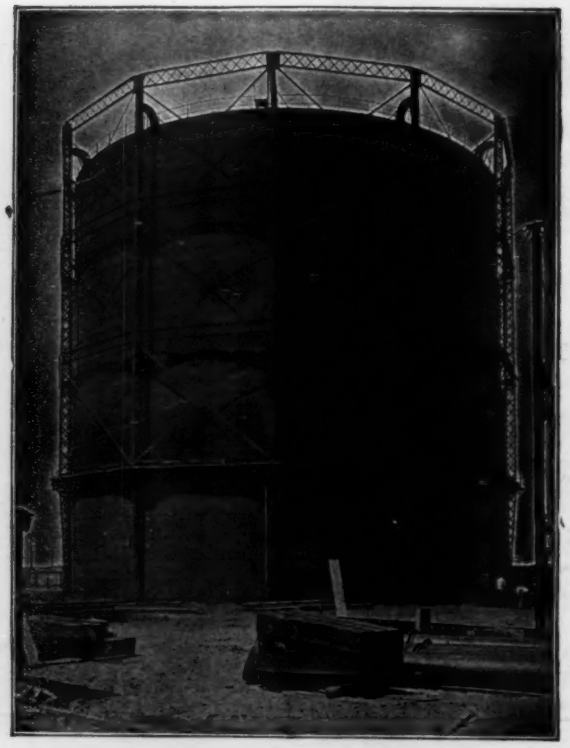

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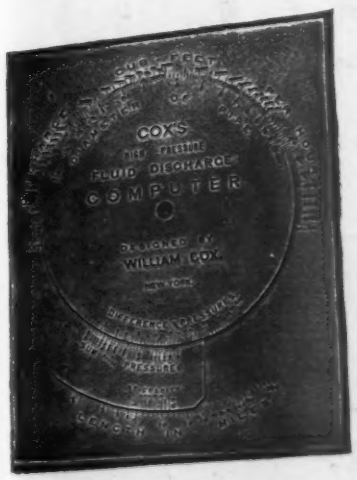

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